



VOL. XXXI.

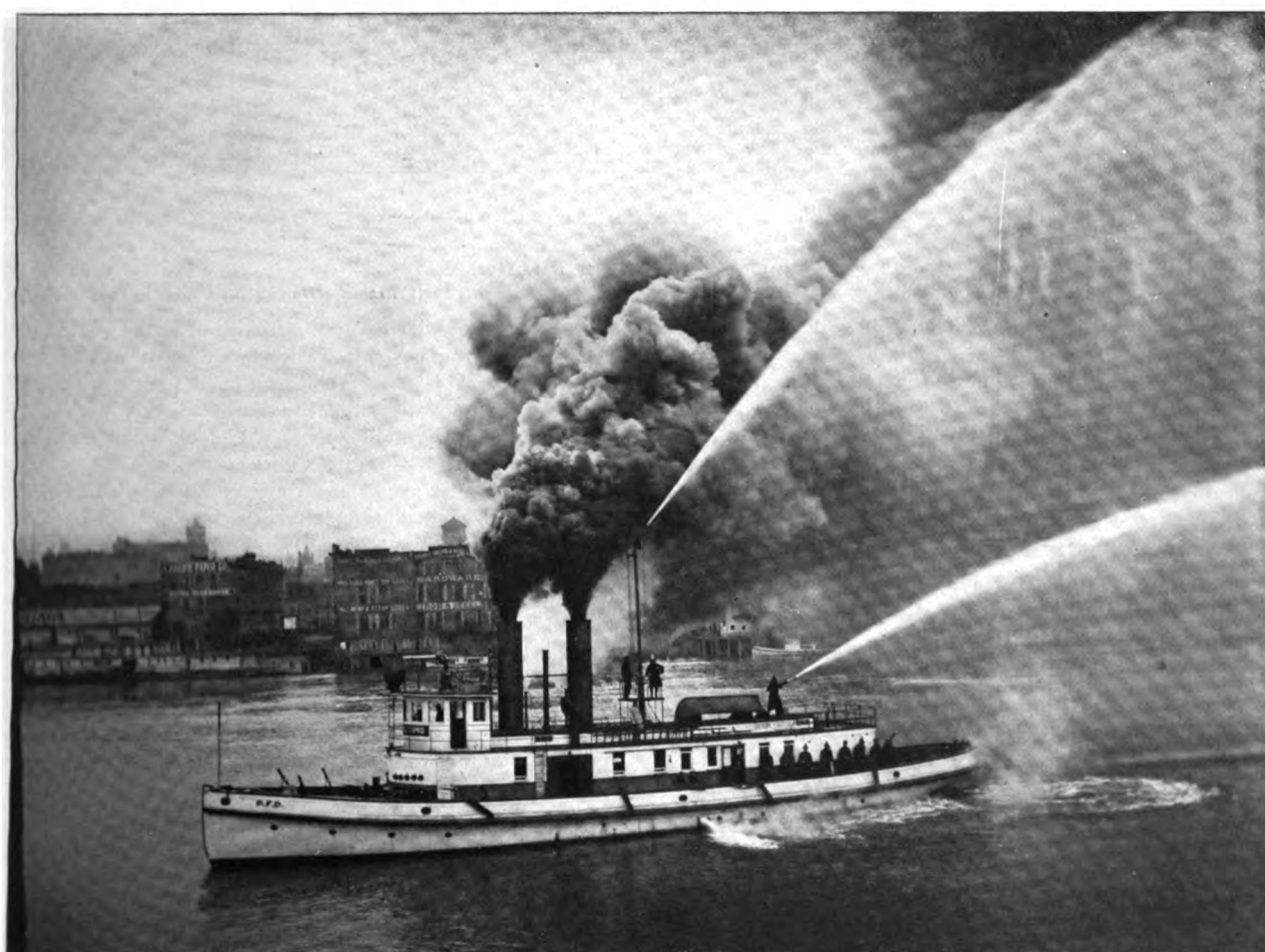
CLEVELAND, O., MARCH 23, 1905.

No. 12.

FIREBOAT GEORGE H. WILLIAMS

The new fireboat George H. Williams, built by the Williamette Iron & Steel Works, Portland, Ore., for city of Portland, has been in service about nine months and has proved herself

6 ft., and for this reason the model had to be full and twin screws had to be chosen. This hull is built very staunchly of Oregon oak and yellow fir. The outside is double planked, diagonally next to the frames and fore and aft outside. As

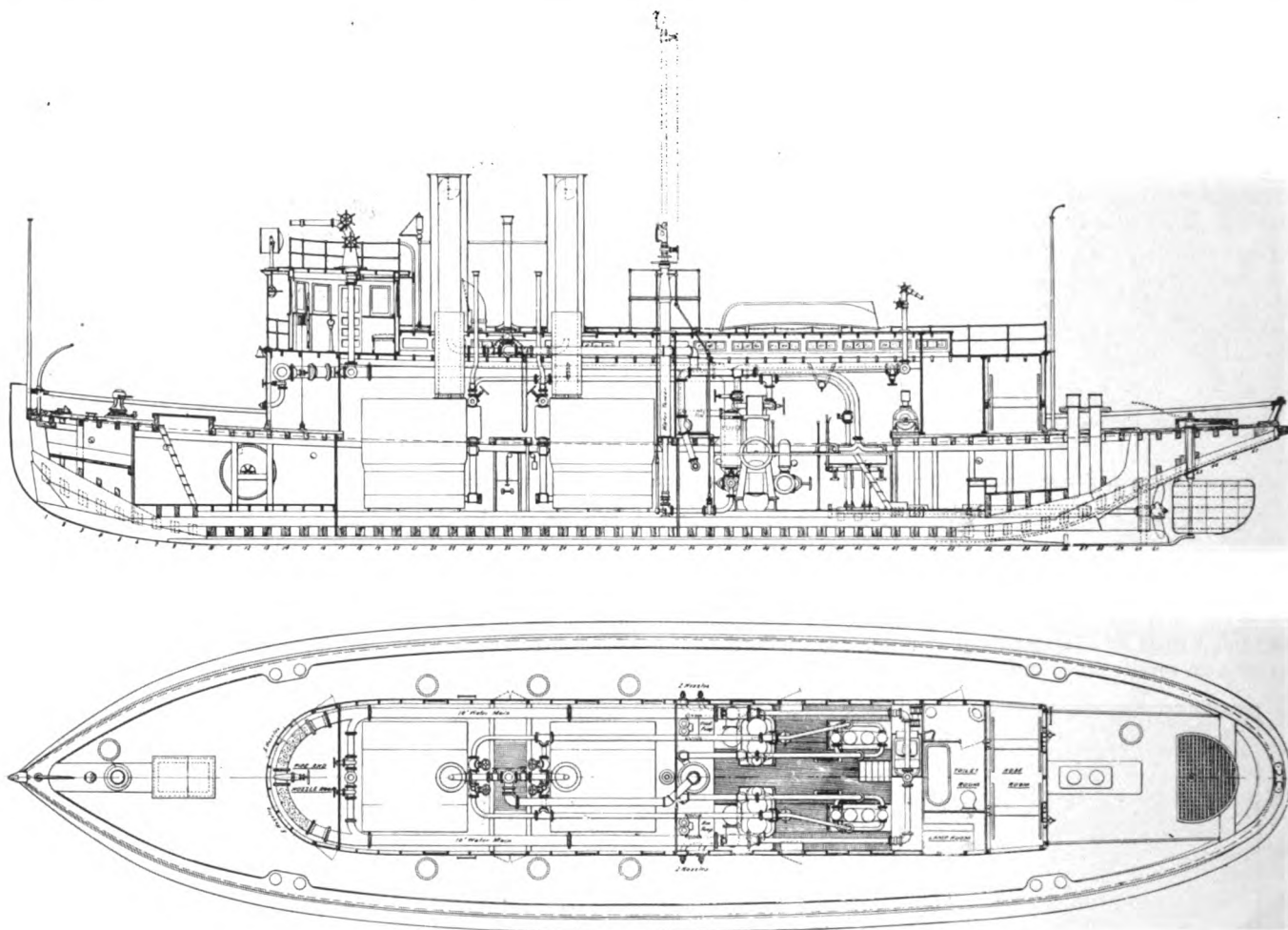


FIREBOAT GEORGE H. WILLIAMS, FOR THE CITY OF PORTLAND, ORE.

[Built by Williamette Iron & Steel Works, Portland, Ore.]

a complete success. It was the original intention of the fire department and the designer to have the hull built of steel, but bids received exceeded the appropriation of \$62,000, and a wooden boat had to be built. In order to reach certain parts of the harbor the draught had to be limited to less than

no heavy weather has to be met, the boat is very low above the water and has not much sheer. The hull is 115 ft. over all, 102 ft. between perpendiculars, 25 ft. molded breadth, and 8½ ft. molded depth. The displacements is 240 tons ready for duty. The hull is divided into four compartments by bulk-



FIREBOAT GEORGE H. WILLIAMS.

[Built by Willamette Iron & Steel Works, Portland, Ore.]

heads. The first compartment contains chain lockers; the second, hose reel and stores; the next, the two boilers and fire room; the fourth, pumps, propelling machinery and workshop.

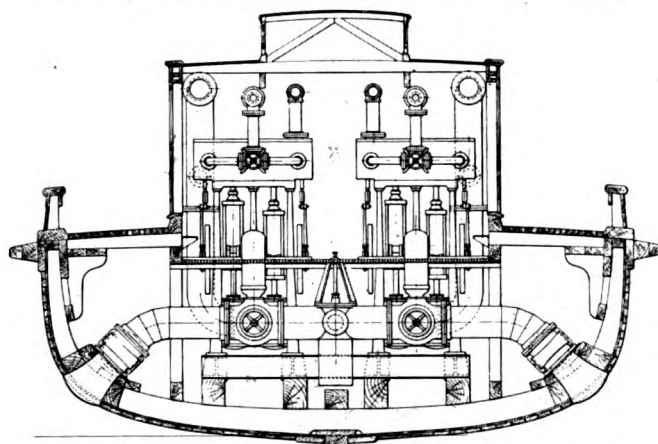
The deck house has a circular front and extends aft over 70 ft. and is 14 ft. wide. It is subdivided by bulkheads, as shown in plan, containing in first compartment, valves and nozzles with ten $3\frac{1}{2}$ -in. outlets around the circular front; in

The vessel is provided with four pairs of strong oak mooring bits, a pair of tow posts, iron chocks, a capstan windlass, metal lifeboat with skids, etc. To insure good steering, the rudder is made exceptionally large and the deadwood between skag and hull is left open. The boat will double her track at full speed in 30 seconds within a radius of 50 ft.

The propelling machinery consists of two pairs of high pressure engines, having cylinders with 10 in. bore and 14 in. stroke, turning with 160 lbs., 250 revolutions per minute, and swinging 5 ft. diameter propellers. The indicated horse power developed is 434, driving the vessel 12 miles an hour. As the water of the Willamette is fresh, condensing apparatus was not required.

There are installed two of the latest American Fire Engine Co.'s fire pumps, each having two steam cylinders, 17 in. in diameter, and water cylinders 10 in. in diameter, with a common stroke of 11 in. The pumps are of the direct-connected, fly wheel vertical type, and with 240 revolutions per minute, will discharge 6,748 gallons. In order to maintain this high speed safely and without undue vibrations, the pumps were seated on a pair of 12-in. I beams, resting on four continuous keelsons, distributing the vibrations over the whole bottom. A 16-in. suction main connects to two 24-in. sea-openings, as shown on cross section. By closing sea-valves and opening valve to bilge, the vessel may be kept clear in case of accident; an opening is also provided in suction pipe to utilize pumps for wrecking purposes. Each pump has a 12 in. discharge, dividing under cabin deck into one 10-in. and one 5-in. branch. The 10-in. branches from each pump run forward and connect together by a circular manifold, from which ten $3\frac{1}{2}$ -in. nozzle branches are taken, couplings and valve wheels projecting through front of house.

The couplings are made especially to take the $3\frac{1}{2}$ in., 3 in.



SECTION AT FRAME 41, LOOKING FORWARD, OF FIREBOAT GEORGE H. WILLIAMS.

next, the boilers and piping; next, the engine room; aft of this, both toilet and lamp room; and then two hose reels. The pilot house is placed on top of deck house and carries on top a 6-in. monitor nozzle and an 18-in. searchlight. A continuous trunk skylight runs from pilot house aft. The upper decks are sheathed with heavy zinc for protection against sparks.

and 2½-in. hose connections. From the verticle 12-in. discharge pipe also branches are taken to two 3½-in. hose connections each side of house, so that in all fourteen of these connections are provided. The discharge pipes are made of semi-steel, with male and female flanges, and the system was tested under 500 lbs. cold water pressure.

To relieve sudden shocks and expansions, copper sections were used between circular-manifold and main pipes, which are branched again aft of nozzle room to supply the 6-in. turret nozzle on top of pilot house. Valves are so arranged that either pump can supply the whole system or only half. The 5-in. branches leading aft from 12-in. vertical discharge pipe supply water to a 2½-in. deck turret.

Steam is generated by two Taylor water tube boilers of latest design. They have a total heating surface of 4,500 sq. ft. and a grate surface of 96 sq. ft. They have 36-in. steam drums, tested for a working pressure of 250 lbs. Stop valves and steam pipes are in duplicate, so that one or both boilers may be used on either port or starboard pump or engine.

The boilers have independent smokestacks, which not only improves their efficiency but also insures a cooler fire room. The exhaust from machinery, after passing through heater located in engine room, is used for draft in stack, or may, by a simple system of butterfly valves, be exhausted directly into the atmosphere.

The boilers have exceeded in their performance all expectations. On trial, pumps and propelling engines were run at full speed, and dampers on boilers had to be kept closed frequently to stop the blowing off. While boat is on duty steam is kept in both boilers at 150 lbs. and records kept show that 1,500 lbs. of ordinary Pacific coast coal is used every twenty-four hours. The great advantage of these boilers over the Scotch type lies in the small space occupied, their capacity, economy, light weight, quick steaming and high pressure. On test, 150 lbs. of steam was raised in a cold boiler in 6½ minutes. The steam after leaving boiler is reduced to 150 lbs. for pumps.

The auxiliary machinery consists of two admiralty type Worthington pumps of 80 gallons per minute capacity, located against forward bulkhead in engine room in easy reach of the engineer. The main feed pump discharges through a copper coil heater, located between the two pumps. This heater has an exhaust connection to a syphon condenser discharging overboard to relieve the pressure in heater due to the chocking of exhaust in smokestacks.

The boat is equipped with a 7-K. W. direct connected G. E. generating set and lighted with electricity throughout. On pilot house is mounted an 18-in. searchlight. The wiring in boiler room is in metallic conduits. Latest improved steam-tight fixtures, switches and cut-out boxes have been used. The electric wiring is connected with the shore, releasing automatically when the vessel leaves the dock.

A novel feature of the boat is the water tower, invented by the designer. This tower represents the first one ever installed on a fireboat and has proven itself a great success. It is located forward of the bulkhead between engine and boiler room and occupies very little space. In principle it consists of a 4-in. brass standpipe, supported at keelson in an elbow connected with the discharge ends of each pump, the inlet to pipe being regulated by a gate valve having its stem extended to a platform on top of deck house. Over the brass standpipe telescopes a 5 in. extra heavy turned steel pipe, having at its bottom end a stuffing box, and carrying on top a gate valve and flexible nozzle, which can be raised or lowered by a rope purchase. The valve is fitted with a chain wheel and chain and can be operated when tower is at any height. The 5-in. pipe is guided by the standpipe on the inside and on the outside by the stand above platform and supported by a 10-in. pipe on the main deck and braced to the house. A split sleeve is supported in this stand, and when the pipe is raised to the desired elevation, this

sleeve is tightly clamped to pipe. The sleeve is surrounded by ball bearings so designed that vertical and lateral strains cause no undue friction, and at bottom of stand another ball bearing takes care of the lateral and vertical pressure when the pipe is at its extreme height. To the sleeve is keyed a large brass hand wheel by which the tower or extended pipe may be swung around its axis. A relief valve is connected to the bottom elbow and its stem is also extended to the platform, so that by opening same the tower can be lowered after the pressure has been shut off, by a simple opening of this relief valve. On test the tower threw a 2¼-in. stream 450 ft. from an elevation of 45 ft. above the water line.

It is obvious that many times fires have to be reached behind obstructions on docks, especially in localities where there is considerable rise and fall in the river. As in most cases it is preferred to make the fireboats fast to the dock, the turrets on deck cannot be used, and an apparatus like the tower will do excellent service. One man can operate it.

On top of pilot house is located the 6-in. Balcock mammoth deck turret or monitor nozzle, and on deck house aft a 4-in. deck turret.

The equipment of the boat includes three hose reels, working in ball bearings, each capable of carrying 1,000 ft. of 3½-in. hose, with couplings. One reel, as above mentioned, is below deck forward and the other two in after end of deck house. The hatch and door openings are fitted with rollers to guard against the hose dragging and cutting. For working hose on deck short lengths are provided and special crutches set in sockets in rail are furnished.

The fireboat was designed by Fred A. Ballin of Portland, and built by the Williamette Iron & Steel Co. of Portland, who sublet the hull to the Portland Ship Building Co. The George H. Williams has now been in service over nine months and David Campbell, chief of the Portland fire department, defies any fire which may try to work its way on the Portland water front.

SHIP BUILDING DURING FEBRUARY

The bureau of navigation reports that twenty-nine sail and steam vessels of 27,837 gross tons were built in the United States and officially numbered during February, as follows:

Districts	Wood.				Steel.		Total.	
	Sail.		Steam.		Steam.			
	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.
Atlantic & Gulf.....	4	36	11	883	2	21,037	17	21,956
Porto Rico.....	2	18					1	18
Pacific.....			3	30			3	30
Hawaii.....								
Great Lakes.....			1	10	1	5,738	2	5,743
Western Rivers.....			5	90			5	90
Total	6	54	20	1,013	3	26,770	29	27,837

Mr. W. J. Wood, naval architect, 709 Rialto building, Chicago, has been asked by several persons to explain the meaning of the lines "this tower will throw a 2¼-in. stream a distance of 400 ft. at an elevation of 1 ft. from the horizontal," occurring in the description of the remodeling of the fireboat Cataract in the ship building issue of the Marine Review. It is more clearly expressed to say that "the tower when throwing a 2¼-in. stream for a distance of 400 ft. from an elevation of about 45 ft. above the water line will show a deflection at top of not over 1 ft. from the vertical line."

Moran Bros. Co., Seattle, Wash., was the lowest bidder for making repairs to the lighthouse tender Columbine, for which bids were recently opened at Portland, Ore. The bids were: Moran Bros. Co., \$1,410; Phoenix Iron Works, Portland, Ore., \$1,548; Williamette Boiler Works, Portland, \$1,890; Vulcan Iron Works, Portland, \$1,790.

HOISTING SAIL OF SQUARE RIGGED VESSELS

Capt. William Williams, a retired sailing master of Oakland, Cal., has invented a device which promises to accomplish a radical change in the handling of all square-rigged vessels.

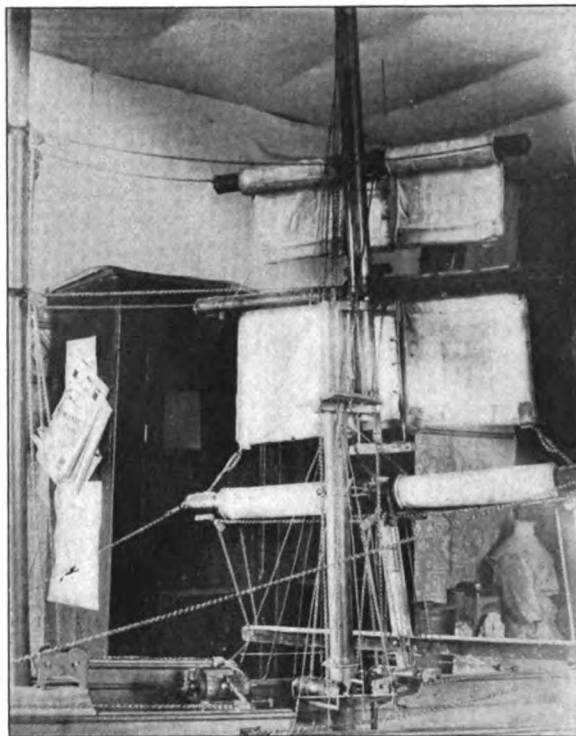
This invention consists practically of a set of winches placed at the foot of each mast whereby a single man by operating a crank can furl, unfurl, or reef a sheet in one minute. To complete any three of these operations on the main yard, lower topsail yard, upper topsail yard, and lower and upper topsail yards, would require an active and able-bodied seaman but five minutes at the five winches. These winches are so arranged as to take up their own slack by reversing cogs. The sheets themselves work on sleeves encircling the yard arms,—operating somewhat on the same principle as the common window curtain. By slipping a brake, the sheets can be allowed to unfurl themselves by a system of counterbalancing weights. The gearing is so arranged that a pressure of only 55 lbs. on the crank will hoist a weight—sails, etc.—of 2,000 lbs. up in the rigging—certainly a great gain of power. The operation of the Williams' patent necessarily only extends to square-rigged vessels.

This labor-saving appliance possesses another notable feature, which lies in the arrangement of winches on a bridge over the deck in front of each mast. By means of this appliance the yards are braced, eased away, or hauled around before the wind by one energetic seaman working three minutes with a crank. The sails may be held very firmly at any desired angle to the wind, same as under the present method. All the tackle used in the Williams patent consists of strong steel wire rope. The system of winches before the mast corresponds to the present interminable tangle of halyards, and besides saving more than half the labor is invaluable in cases where the wind takes the vessel hard aback. Under the old system it was almost impossible to furl under these conditions. Under the new appliances the sails may be furled as easily then as at any time—amidst a howling tempest, or calm. The force or direction of the winds make very little or no difference.

All this work is done from the deck, and there is no necessity for sending seamen aloft in darkness and storm at the imminent peril of limb and life. In the event of sudden emergencies, the sails may be reefed, or shortened very quickly, and danger averted.

It is a noteworthy fact that for centuries the method of handling sheets on board sailing craft has undergone no radical changes. The heavy blocks, tackle and tangle of halyards and rigging are about the same as when Columbus crossed the stormy Atlantic on his memorable voyage of discovery. It requires now about twenty-four able-bodied seamen to man a full-rigged ship. By using half that number, as would be necessary in adopting the Williams appliances, a saving of twelve men for one year at \$18 per month would result in thus saving to the owner of the vessel \$2,594 per annum—not counting the cost of provisions. The necessary appliances would cost a considerable sum, but, in the long run, would be a most

economical measure. Capt. Williams' invention is attracting much attention and interest now in shipping circles, and the members of the Merchants' Exchange of San Francisco are very favorably impressed with it.



DEVICE FOR HOISTING SAILS OF SQUARE-RIGGED VESSELS.

with some of the New York interests that were not heard because of the lack of time when the commission met in this city last May.

"The shipping bill framed by the commission was promptly and favorably reported at the recent session of both houses of congress. On three out of four of the main points of the bill—the naval retainers, the new ocean mail lines and the increased tonnage taxes—there was substantial agreement between the majority and minority senators and representatives. The one point of difference was as to the method of aiding and encouraging general commercial tonnage outside of the mail lines—the majority of senators and representatives favoring the subvention of \$5 per gross registered ton and three members of the minority urging the return of discriminating duties.

"On the important point of government action for the up-building of the merchant marine the commission, therefore, was entirely and heartily unanimous; the only difference, and that on one of the four features of the bill, was as to the exact method of legislation.

"This is a significant fact which seems to be overlooked in some of the comment on the work of the commission, both here and abroad. It is rather interesting to note that neither on the commission itself nor on the two committees of congress which have considered the bill of the Merchant Marine Commission did the division run strictly along party lines. The minority report of the senate committee on commerce was signed by only three of the six minority senators and in the house committee by five of the six minority representatives. There is therefore no reason for believing that whatever action may be taken the new congress will strictly follow party lines. And it is well in this connection to remember that the administration majority, which was only about thirty in the last house, reaches the enormous figure of more than one hundred in the new house of representatives.

"As the bill framed by the Merchants' Marine Commission

FUTURE SHIPPING LEGISLATION

It is probable that New York shipping interests and also those of other important centers will be given a further opportunity to present their views to the Merchants' Marine Commission before the shipping bill is introduced into the new congress. Mr. Winthrop L. Marvin, secretary of the commission, who was in New York last week, gave his views on the subject of legislation as follows:

"In the closing days of the session congress authorized and directed the continuance of the Merchant Marine Commission to enable it to make whatever further inquiry it may desire to undertake throughout the summer and until the assembling of the new congress. As yet no definite plans have been made by Chairman Gallinger or his associates as to this further inquiry; but it is possible that the commission will confer

has been so promptly and heartily reported to congress, and as it seems to have aroused a minimum of antagonism, it is hardly probable that any important change will be made in it before its introduction on the first day of the new congress unless the suggestions made at such hearings and conferences that the commission will hold during the spring and summer months may justify it.

"I think that it may safely be said that the feeling in Washington is that some positive action by the new congress for the upbuilding of our ocean fleet is inevitable. Such action will be all the easier from the fact that the next session of congress will be the longer session and that in both houses the new national administration will have not only a very great prestige but very great majorities.

"It is rather interesting that there has been an active and constant demand for the report of and testimony before the commission from London, Liverpool, Glasgow, Hamburg, Bremen and other foreign shipping centers, and from foreign legations in Washington. The eagerness of ship owners and governments of other lands to read for themselves the recommendations of the commission and the lively apprehensions that have freely been voiced abroad are in their way satisfactory evidence that the commission has drafted a plan for the restoration of the American merchant marine which our foreign competitors regard with keen dread as very practical and effective.

"The shipping bill is receiving very friendly attention at the Southern seaports. I am informed that the chamber of commerce at Newport News and Norfolk already formally approved it and that the measure is under consideration in New Orleans. Resolutions indorsing the bill and urging congress to pass it have been received from the National Board of Trade, the Philadelphia Board of Trade and the Chamber of Commerce of San Francisco, and also from the masters and pilots of steam vessels at their annual convention at Washington."

LAKE UNDERWRITERS' MEETING

Buffalo, March 21.—The annual meeting of the lake underwriting interests, Inland Lloyd's and representatives of the companies in that branch of insurance, which was held here last week seems to have dealt a further blow to the already disappearing fleet of wooden vessels on the lakes, for last season's rates were fixed on the steel fleet and the meeting adjourned without deigning to take up the wooden fleet at all, which is to say "get what you can out of the poor things, as a body we wash our hands of them." It seems that this refusal to make rates on the wooden vessels was quite justified from the history of the business of late, as it is stated by authority that the hull business would have been disastrous last season had it not been for the steel fleet. The number of total losses in that section is always large and it will continue large, with the moral hazard increasing rather than otherwise.

With the exception of no rates made on package freight, over which there is expected to be a scramble the lake insurance business is expected to go on as before, for the plan of bunching steel and wood hulls and insisting on all being taken or none is already old and it will last till the wood fleet is out of the way. A vessel owner who knows how such things go said the other day that he saw two very radical defects in the system, coming one from each side of the business. As it is now the agent is working on a commission and his profits depend so entirely on the amount of business done that he is tempted to take risks that are far from the best and so is likely to load his list down with such as are "morally" certain to cut the earnings down to nothing. Put the agent on a salary, continued the vessel owner, and there would be no taking of risks that were doubtful in order to get those that were good. But that plan, of course, has its drawbacks, which possibly the vessel owner has not considered. He is of the opinion that

the companies will go on as at present for awhile, as the English capitalists who now control the lake insurance business look upon it as a minor matter, but they will some day find their losses so continuous that they will call a halt. Meanwhile it will have to be noted that the list of the money-losing part of the lake fleet is now small in comparison with the others, so that possibly the state of things will improve rather than otherwise, till there is regular all round profit in the business.

The second practice that is pronounced wrong comes from the side of the vessel owner, who is allowed to take advantage of the fact that his steel-bottomed craft is in a fashion seaworthy after getting quite a bad rap or a severe scrape on a submerged rock, so he tinkers the vessel up after such an experience and plunges ahead. Before long he meets with a similar accident and salves up the breach as before, the insurance authorities winking at the practice. This goes on till the season closes and then the vessel is docked—when, behold; there is a job that makes the dry-dock people feel comfortable all over.

Take the case of the steamer W. S. Mack, that lately came out of Buffalo dry dock. She had met with several accidents during the past season, but was not docked till winter, thus saving herself a lot of time, but had been banged up so that when she was stripped of her defective plates for the needed work she looked fairly like a new frame set up for covering. As to the bill, well the dry dock people do not make any reports of that character and it does not really matter just now.

The point made by the vessel owner is that if the average vessel that has been breached is ordered to dry dock by the insurance authorities as soon as she can get there and has to wait for the work needed then and there she will likely lose a trip, which nobody will pay her for, and the chances are good that there will be a trifle more care exercised after that and possibly the single accident will answer her for the entire season.

But let these injuries merely pile up all through the season and there is the greatest possible temptation to slam a steel boat through and so get in a trip or two during a season that she is not really entitled to and which adds very much to her expensiveness, all of which comes out of the vessel owners as a whole, the carefully handled boat paying a full share of the rate that has been made excessive by this practice.

Everybody knows that the expensiveness of the steel bottom on the lakes was a great surprise to the insurance authorities and to owners as well, and it is quite possible that the abuse here pointed out has done much towards rolling up the unlooked for costliness. It will not be easy to put a stop to it, though.

JOHN CHAMBERLIN.

MERCHANT MARINE OF NORWAY

Editor Marine Review—Sir: At the end of 1903 Norway had 876 steamships and 2,111 sailing vessels, in all 2,987 ships of 1,337,875 aggregate tonnage, engaged in foreign trade. That is nearly 500,000 tons more than we have, though our foreign commerce is many times greater than that of Norway, or even Norway and Sweden combined. In addition Norway has 4,216 steam and sailing ships of 106,029 tonnage, engaged in her coast trade and arctic fisheries. Her total merchant marine was 7,203 vessels of 1,443,904 aggregate tonnage. Losses by shipwreck for the year were 185 vessels of 82,700 tons. These were replaced by new ships bought abroad or built at home to the number of 207, of 28,041 tons. Gross earnings for 1903 are not available, but in 1902 the amount was \$29,700. We paid a good deal of that as many Norwegian ships are engaged in the American fruit trade. About 82,000 persons in Norway are dependent on her shipping industry. In 1903 the marine insurance carried was \$55,000,000.

WALTER J. BALLARD.

Schenectady, N. Y.



DEVOTED TO EVERYTHING AND EVERY INTEREST CONNECTED
OR ASSOCIATED WITH MARINE MATTERS
ON THE FACE OF THE EARTH.

Published every Thursday by

The Penton Publishing Company,
CLEVELAND, OHIO.

CLEVELAND:	BROWNING BUILDING.
CHICAGO:	MONADNOCK BUILDING.
DETROIT:	HAMMOND BUILDING.
NEW YORK:	150 NASSAU STREET.

*Correspondence on Marine Engineering, Ship Building and
Shipping Subjects Solicited.*

Subscription, \$8.00 per annum. To Foreign Countries, \$4.50.
Subscribers can have addresses changed at will.

The Cleveland News Co. will supply the trade with the **MARINE REVIEW**
through the regular channels of the American News Co.

Entered at the Post Office at Cleveland, Ohio, as
Second Class Matter.

MARCH 23, 1905.

'Tis a very old fable—that of killing the goose that laid the golden egg but it seems to be exemplified in modern life. The ship building plant of the Townsend & Downey Co. on Shooters Island, New York, originally worth \$1,500,000 has been sold to the Colonial Trust Co. for \$516,000 on behalf of the bond holders. The plant consists of eight buildings on a tract of thirty-three acres with a water frontage of a mile and a half. Three years ago this company was doing a fairly prosperous business. It had large contracts on hand for vessels for the coastwise trade, it had just achieved international reputation in yacht designing and building through the construction of the sailing yacht Meteor for the German emperor and it was about to undertake vessels for deep sea navigation. It was doing a wholesome business and making a reasonable profit on the investment when the labor unions invaded its works and made demands for shorter hours, higher wages and a discharge of all non-union men. It was useless for the company to protest that it could not grant the demands and make a profit in the business. Strike was declared chiefly to enforce the "closed shops." Months went by, the company slowly sank under the handicaps imposed upon it and eventually ended in bankruptcy. The "close shop" idea was put into effect thoroughly but the "closed shop" advocates

left no business at all to manage and had to seek work elsewhere.

It will be noted elsewhere in this issue that brief reference has been made to the statement of Mr. James C. Wallace, president of the American Ship Building Co., that ship building has reached such art on the lakes that ships are no longer built but manufactured. System and standardization has been brought to such a pitch that the American Ship Building Co. really thinks nothing of taking a contract to complete the biggest freighters in three months' time. Scarcely seven weeks elapsed from the time that the first keel plate was laid for the latest launch, the Philip Minch, until the vessel left the stocks. This is a remarkable achievement as it must be borne in mind that the latter-day lake vessel is exceeded in size by very few ocean liners. There are probably not more than twenty-five vessels in the North Atlantic trade that are larger than the vessels that have been built during the past year on the great lakes. This remarkable accomplishment has been brought about by specialization such as exists in British yards which make a specialty of a certain type of craft and build them for every country on the globe. The supremacy of the great lakes over the other ports of the United States in the ship building line is due entirely to specialization, the fact being that the ships are of a special design for a special trade. It is a further evidence to what protection can do for shipping and ship building. The shipping of the great lakes is protected, first, by nature, and second by the coastwise laws. No ships can be built elsewhere to compete with the great lakes trade because there is no way of getting them to the great lakes. The only ship that is profitable to operate on the great lakes is the large carriers which have become too large to navigate Canadian canals. But even if it were possible to get them to the lakes the great bulk of the trade is port to port trade between American ports and from this they would be excluded by the coastwise law.

Granted the same conditions what is done in one place can be done quite as well in another. If the general government will give to American ships on the high seas the same degree of protection as is afforded to them on the great lakes there would be speedily on the oceans of the world quite as magnificent a fleet bearing the stars and stripes as now bears that flag on the great lakes. Until congress does give this protection, however, there will be no such American fleet on the ocean.

It is well known that it was through liberal subsidies for carrying the mails in steamers that Britain was able to force the carrying trade to all quarters of the globe and the Merchant Marine Commission was very wise in recommending the establishment of mail routes in addition to those already provided for in the postal act of 1891. Trade with Central and South America is rapidly developing and will continue to develop

in greater proportion as work progresses on the Panama canal. Southern ports have felt the handicap of lack of regular sailings, and the establishment of mail routes from the gulf would do great good. It was the testimony of lumber interests of the south before the Merchant Marine Commission that the export trade was frequently the salvation of their business, but it was rendered uncertain by dependence upon the foreign tramp ship which might come or might not. Again the trade to the Orient is expanding and with an assured market in the Philippines and mail routes to China and Japan the American manufacturer is bound to get his share of it.

CONTRACTS FOR TWO NEW STEAMERS

Capt. John Mitchell of Cleveland has given contract to the American Ship Building Co. for two steamers to be delivered on April 15, 1906. In dimensions they will equal the steamers Amasa Stone and W. A. Rogers, but will differ materially in construction. Their dimensions will be 545 ft. over all, 525 ft. keel, 55 ft. beam and 31 ft. deep. During the past two or three years it has been the practice to give steamers of these dimensions thirty-two hatches spaced 12-ft. centers. These new steamers, however, will have only sixteen hatches spaced 24-ft. centers, being 12 ft. wide in a fore and aft direction. They will be constructed on the arch girder system but the hopper sides will be straight. The cargo hold will be divided by two bulkheads into three compartments, each compartment having a carrying capacity of about 3,300 gross tons. It will be noted that these 24-ft. hatches are 3 ft. wider in a fore and aft direction than the ordinary 12-ft. or 24-ft. hatch. Capt. Mitchell was asked why he returned to the 24-ft. hatch, and he replied that in his judgment it made a more serviceable vessel. The deck space between hatches will be 12 ft. and therefore the bulkheads can be set 6 ft. back from the hatch openings where they will be free from the mutilation of the unloading bucket as it enters and leaves the hatch and at the same time sufficiently near to permit the bucket to reach every portion of the cargo. He thought also that the dock companies would appreciate the 24-ft. hatch with its added width owing to the fact that it would lessen the number of shifts in unloading. Regarding the division of the boat into three compartments Capt. Mitchell said that it was all very well for the Pittsburg Steamship Co. to build boats with a continuous hold because it could carry its own ore at all times, but that as he was simply a vessel owner and no independent connections he wanted a boat that could carry several kinds of ore at once.

"The big chaps," said Capt. Mitchell, "can dictate to me, but I've got to have a boat that can meet the various conditions of trade. They can fill their own boats with a single kind of ore, but they may want me to carry several different kinds and I cannot do it unless I have a boat built for that purpose. Moreover the upkeep of sixteen hatches is one-half the upkeep of thirty-two. That's merely a detail, but it counts in the long run."

The new steamers are to be equipped with triple-expansion engine 23½, 38 and 63 in. cylinder diameters, by stroke of 42 in., supplied with steam from two Scotch boilers 14½ ft. diameter and 11½ ft. long.

Mr. Wallace, president of the American Ship Building Co., is figuring on another vessel, the details of which are not, however, ready for announcement.

It is reported from Toledo that the Craig Ship Building Co. has closed a contract with L. S. Sullivan representing a syndi-

cate of Toledo capitalists, for the construction of a 500-ft. steel freighter, and that the company is to be known as the Toledo Steamship Co. with Mr. Sullivan as general manager.

The steamer Amasa Stone, building at the Wyandotte yard of the American Ship Building Co. for Pickands, Mather & Co. of Cleveland, will be launched on Saturday of this week and at the same time the steamer James E. Davidson building at the Ecorse yard of the Great Lakes Engineering Works for Mr. G. A. Tomlinson of Duluth will also be launched. In order that those interested may see both launches one will occur at noon and the other at three o'clock.

TWO LAKE LAUNCHES LAST WEEK

On Saturday last the American Ship Building Co. launched two steamers, one at Lorain and the other at West Bay City. The Lorain steamer is building for Mr. Henry Steinbrenner of Cleveland and was christened by his sixteen year old daughter Miss Gertrude Steinbrenner. Owing to the recent death of Mrs. Anna C. Minch, the president of the Kinsman Transit Co., the affair was conducted as quietly as possible. Precisely at two o'clock the signal was given to release the vessel on the ways and Miss Steinbrenner smashed the customary bottle of champagne just as the vessel gained headway. The new steamer was christened Philip Minch. The steamer took the water on an even keel and marked another of the satisfactory launches of the American Ship Building Co. After the launch luncheon was served at the yard by the American Ship Building Co. The guests were: Mr. and Mrs. Henry Steinbrenner, Mr. and Mrs. P. J. Minch, C. A. Moriarty, David Moxon, Frank H. Steinbrenner, G. H. Minch, G. H. Selzer, Robert Wallace, Mr. and Mrs. George Davies, Mr. and Mrs. G. R. Couch, Charles Couch, Mr. and Mrs. Tom Andrews, Mr. and Mrs. G. A. Steinbrenner, C. A. Klump, Mr. and Mrs. F. H. Neff, Mr. and Mrs. L. W. Davis, Mr. and Mrs. William Dreher, Mr. and Mrs. Henry, Louis Poplowsky, Mrs. Fitzsimmons, Mr. and Mrs. G. M. Steinbrenner, Mr. and Mrs. Frank Harris, Mr. Jacob Englebray, Mrs. S. Trinter, W. P. Trinter, Mr. and Mrs. W. H. Miller, Mr. and Mrs. Captain Joseph Lampoh, Miss Laura Baxtine, Captain Con Young, Miss Bessie Keese, Miss Alice Keese, Miss Grace Armstrong, H. E. Benfield, Miss Edna Armstrong, P. H. Steinbrenner, C. P. Steinbrenner, Miss Gertrude Steinbrenner, Miss Jessie Steinbrenner, Mr. and Mrs. Louis Body, Frank Williams, George Bate, H. L. Schneider, Mr. and Mrs. A. Steinbrenner, Clarence Pritchard, O. L. Doty, Charles Barry, R. J. Wallace, Horatio Harriman, Mr. and Mrs. Hassentlue, W. H. McGean, Capt. C. L. Hutchinson, Capt. Henry Stone, and W. F. Seitz.

The new steamer is the second one to be named Philip Minch. The first one, which was a wooden steamer, was destroyed by fire last fall. The new steamer is 500 ft. over all, 480 ft. keel, 52-ft. beam and 30 ft. deep. She will have triple expansion engines with cylinders 22½, 36 and 60 in. by 42 in. stroke. Steam will be supplied by two Scotch boilers 13 ft. 9 in. by 11½ ft. long and fitted with Ellis & Eaves draft. Her carrying capacity will be 8,000 gross tons. Capt. James Lampoh, who sailed the steamer Henry Steinbrenner last season, will bring out the Minch.

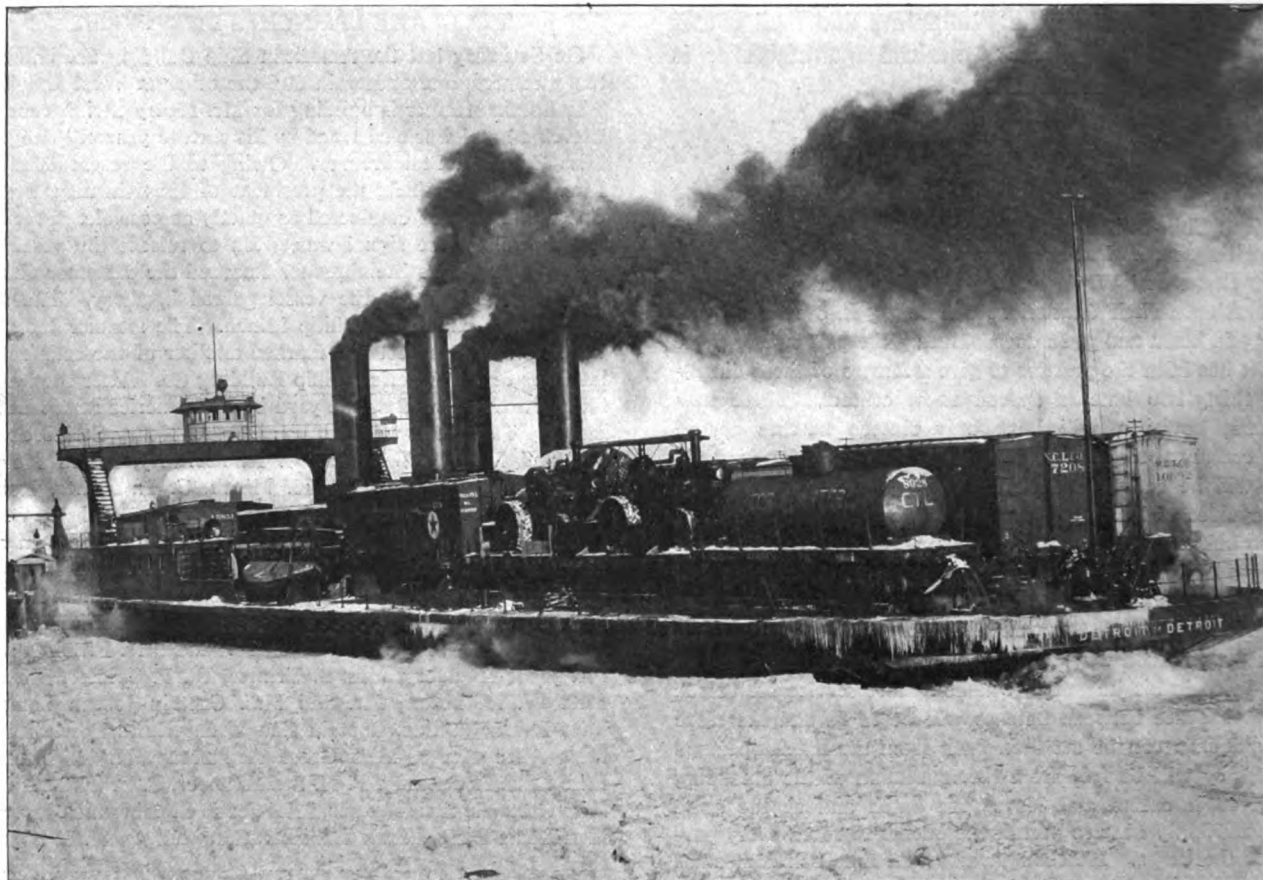
The West Bay City steamer is building for the Duluth Steamship Co. of which Mr. G. A. Tomlinson is managing owner and was named Sylvania by Miss Marion Davidson Young, a niece of Mr. Tomlinson. Mr. G. A. Tomlinson and a large party of friends from various ports along the great lakes attended the launch and the event was made quite a social feature. Mr. James E. Davidson entertained a party of fifty visitors at a dinner at the Bay City Club following the launch. The Sylvania is the largest vessel ever built at Bay City, being 524 ft. over all, 504 ft. keel, 54-ft. beam and 30 ft. deep. She will have triple expansion engines with cylinders 22½, 36 and 60 in. diameters by 42 in. stroke. Steam will be supplied by two Scotch boilers.

APPOINTMENTS OF MASTERS AND ENGINEERS

Montreal Trans. Co., James A. Cuttle, managing director, Montreal, Que.: Steamers—Westmount, Capt. Alexander Milligan, Engineer Kemp Richardson; Fairmount, Capt. P. C. Telfer, Engineer Wm. Newbold; Rosemount, Capt. John Wood, Engineer Richard Taylor; Bothnia, Capt. John Doyle, Engineer, Wm. Spencer; Advance, Capt. —, Engineer George Hazlett. Tugs—Emerson, Capt. James Murray, Engineer George Henderson; D. G. Thomson, Capt. Joseph Murray, Engineer George Boyd; H. F. Bronson, Capt. Charles Martin, Engineer R. Hepburn. Barges—Minnedosa, Capt.

Costello; Avon, Capt. George Clifford, Engineer Freeman Axtell. Tugs—George D. Seymour, Capt. P. J. McGrath, Engineer Thomas O'Neil; Myra, Capt. James Martin, Engineer Frank Norris. Barges—Henry Witbeck, Capt. Justin Mallette, Sr.; Fred Carney, Capt. Timothy Hunt; Isaac Stephenson, Capt. O. C. Wilcox; Menominee, Capt. Justin Mallette, Jr.; Hoboken, Capt. A. Demars; H. B., Capt. Alfred Lalonde; James Buckley, Capt. Alderic Derocher; Ireland, Capt. P. Thiverge.

Reid, James, Sarnia, Ont.: Steamers—Manistique, Capt. John Cooper, Engineer Wm. King; James Reid, Capt. James



MICHIGAN CENTRAL CAR FERRY DETROIT CROSSING THE RIVER IN THE ICE.

Built by Great Lakes Engineering Works, Detroit.

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John Phillips; Hamilton, Capt. James Kirkwood; Quebec, Capt. Henry Milligan; Melrose, Capt. R. A. Davey.

Booth & Co., A., Chicago, Ill.: Steamers—America, Capt. Jacob F. Hector, Engineer J. McMillan; Bradshaw, Capt. B. Lewis, Engineer —; Caribou, Capt. J. L. Baxter, Engineer —; Manitou, Capt. James Wilson, Engineer —; Moore, Capt. Ed. Smith, Engineer —; Easton, Capt. H. Calson, Engineer —; Soo City, Capt. —; Engineer Al. Krogman.

Great Lakes & St. Lawrence Transportation Co., Duluth, Minn.: Steamers—A. M. Marchall, Capt. John Duncan, Engineer George McMonagle; John Crerar, Capt. Alex. Craigie, Engineer John Bustead; John Lambert, Capt. Ralph Gleason, Engineer Wm. T. Riley; Robert Wallace, Capt. D. A. Kiah, Engineer George T. Willard; A. D. Davidson, Capt. Hugh Hagan, Engineer W. N. Newcomb; S. N. Parent, Capt. J. W. Goodrich, Engineer J. W. Drysdale; H. G. Dalton, Capt. W. D. Waite, Engineer Guy L. Barnhart; J. S. Keefe, Capt. Dan Barry, Engineer George Winters; John Sharples, Capt. J. F. Johns, Engineer L. W. Griggs; George C. Howe, Capt. Frank C. Pratt, Engineer J. H. Norton.

Ogdensburg Coal & Towing Co., Ogdensburg, N. Y.: Steamers—Nicaragua, Capt. James Owen, Engineer D. G.

T. Reid, Engineer Wm. Oakes; Ottawa, Capt. George H. Phelps, Engineer Walter Thorne; Winslow, Capt. A. Harris, Engineer, S. Radcliff; Salvor, Capt. Charles Hill, Engineer John Kinsley; Sarnia, Capt. James Ryney, Engineer John Taylor; J. M. Diver, Capt. H. B. Reid, Engineer Frank Moore; Tempest, Capt. L. McFarland, Engineer L. Cuthbertson. Schooners—John Kelderhouse, Capt. Wm. Ryder; Bell Hanscomb, Capt. A. D. McLean; Oliver Mitchell, Capt. L. Vansomer.

Kelley Island Lime & Transportation Co., Cleveland, O.: Steamers—A. Y. Gowen, Capt. C. Smith, Engineer D. Means; Alvah S. Chisholm, Jr., Capt. Dan Henderson, Engineer T. Mahoney; Isabella J. Boyce, Capt. J. M. Smith, Engineer Alex. McLea; Desmond, Capt. Alfred Dixon, Engineer D. Conway; Norma, Capt. W. P. Wheeler, Engineer Lewis F. Miller. Barges—Fannie Neil, Capt. W. A. Fetterly; David Moran, Capt. J. M. Robinson. Under construction—steel barge No. 1, Capt. A. Brandt; steel barge No. 2, Capt. Wm. Halley; new tug, Capt. John H. Wyson, Engineer Ed. Reilly.

Deseronto Navigation Co., Deseronto, Ont.: Steamers—Resolute, Capt. John Cowan, Engineer John Hainson; Reliance, Capt. James Dougherty, Engineer John Topping; Ella Ross, Capt. D. B. Christie, Engineer M. J. McFaul; Deseronto,

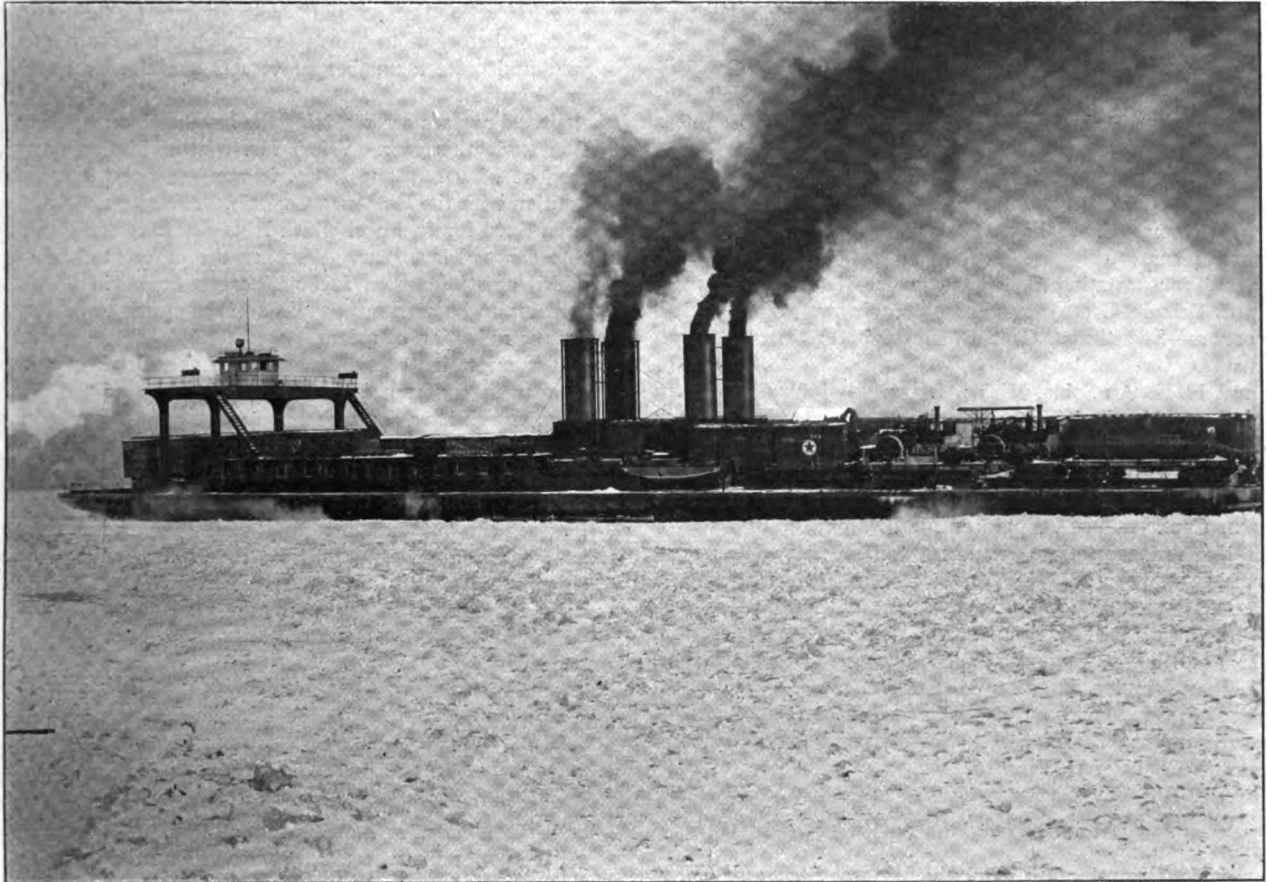
Capt. M. Palmateer, Engineer Stanley La Rue; Rescue, Capt. P. J. Lynch, Engineer Owen Flood; Armenia, Capt. Albert Bamhart, Engineer Michael Topping; Ranges, Capt. Howard Burmip, Engineer Wm. Stanhope; Arctic, Capt. W. J. Daly, Engineer Thomas Lynch. Schooner—Recruit, Capt. Daniel McVicker.

Detroit, Belle Isle & Windsor Ferry Co., Detroit, Mich.: Steamers—Columbia, Capt. John Wilkinson, Engineer Henry Free; Pleasure, Capt. George D. Horn, Engineer Hugh McAlpine; Promise, Capt. Robt. E. Ferguson, Engineer Albert E. Garland; Sappho, Capt. D. Jacques, Engineer Wm. Wilkie; Garland, Capt. Michael McCune, Engineer James Foster; Excelsior, Capt. Archibald Bain, Engineer S. G. Merritt; Vic-

Peavey Steamship Co., Duluth, Minn.: Steamers—Frank H. Peavey, Capt. A. G. Tappan, Engineer James Patterson; George W. Peavey, Capt. L. E. Boyce, Engineer A. L. Roberts; F. T. Heffelfinger, Capt. John Tower, Engineer W. L. Sperry; Frederick B. Wells, Capt. Alva Shaver, Engineer George A. Gardner.

Provident Steamship Co., Duluth, Minn.: Steamers—James H. Hoyt, Capt. W. A. McLeod, Engineer W. A. Moudy; D. G. Kerr, Capt. E. D. Ballentine, Engineer Gilbert Patterson; J. H. Reed, Capt. E. P. Houghton, Engineer James A. McPhee; D. M. Clemson, Capt. S. R. Chamberlain, Engineer Jay A. Popp.

Algoma Central Steamship Co., Sault Ste. Marie, Ont.:



MICHIGAN CENTRAL CAR FERRY DETROIT CROSSING THE DETROIT RIVER IN THE ICE.

Built by Great Lakes Engineering Works, Detroit.

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toria, Capt. Peter Williams, Engineer Walter Merrill; Papoose, Capt. J. H. Halcro, Engineer Wm. Hyde.

Hawgood & Co., W. A., Cleveland, O.: Steamers—Edwin F. Holmes, Capt. James Owen, Engineer John Chapman; Bransford, Capt. C. C. Balfour, Engineer Alex. B. Wilson; J. M. Jenks, Capt. M. Tinney, Engineer Thomas Braund; Harold B. Nye, Capt. A. B. Keller, Engineer C. W. Stedman; Iosco, Capt. N. Gonyau, Engineer Frank W. Gorden. Schooner—Olive Jeanette, Capt. W. A. Serles.

Hawgood, Henry A., Cleveland, O.: Steamers—Wisconsin, Capt. George Robarge, Engineer Wm. R. Stewart; Umbria, Capt. C. M. Saph, Engineer Anthony Ward; H. B. Hawgood, Capt. Thomas Ellis, Engineer S. H. Roswell; Etruria, Capt. J. D. Greene, Engineer R. B. Buchanan; S. S. Curry, Capt. John Hollingshead, Engineer George P. Smith.

Helm, Arthur C., mgr. Estate W. M. Egan, Chicago, Ill.: Steamers—Philip D. Armour, Capt. F. A. Chamberlain, Engineer F. Krating; John Plinkinton, Capt. L. A. Rand, Engineer Charles Benschnieder; Wiley M. Egan, Capt. J. P. Saph, Engineer C. H. Drein; R. P. Fitzgerald, Capt. Fred Howe, Engineer T. Carlson.

Steamers—Paliki, Capt. Ben Garvie, Engineer James Gregg; Leafield, Capt. W. C. Jordan, Engineer James Cameron; Monkshaven, Capt. Peter McIntyre, Engineer Samuel Beatty; Theano, Capt. George W. Pearson, Engineer James Smith; Schooners—Agawa, Capt. James Glammon; J. J. Barlum, Capt. R. C. Erwin.

Mills, N. & B., Marysville, Mich.: Steamers—Nelson Mills, Capt. Dan Warwick, Engineer E. J. Moore; Thomas R. Scott, Capt. Paul Rivard, Engineer ———; H. J. Kendall, Capt. H. J. Kendall, Engineer Fred Thurman. Barges—Biwabik, Capt. D. B. Cadotte; Alex. Anderson, Capt. J. K. Edwards.

Nessen & Co., J. O., Manistee, Mich.: Steamers—F. W. Fletcher, Capt. H. Bennett, Engineer George Hopkins; Albert Soper, Capt. A. E. Anderson, Engineer Harry Moore; Charles Rietz, Capt. Christ. Edwardson, Engineer Joe Seymour; N. J. Nessen, Capt. J. E. Jacobson, Engineer George Patterson.

Sullivan, L. S., Toledo, O.: Steamer—David W. Rust, Capt. Wm. J. Seaver, Engineer Wm. Hastey. Barges—C. C. Barnes, Capt. G. E. Nelson; George G. Houghton, Capt. George R. Bonnah. Schooner—John Schuette, Capt. John O. Johnson.

Muskegon Steam Barge Co., Muskegon, Mich.: Steamers—

S. M. Stephenson, Capt. James Sanford, Engineer A. McMillan; John Otis, Capt. Peter Youngs, Engineer A. A. Green; Mathew Wilson, Capt. W. E. Stufflebeam, Engineer Donald McMillan.

Canadian Pacific Railway Co., Owen Sound, Ont.: Steamers—Manitoba, Capt. E. B. Anderson, Engineer Wm. Lewis; Athabascam, Capt. George McDougall, Engineer Wm. Lock-
erbie; Alberta, Capt. L. Pyette, Engineer A. Cameron.

Sharp, W. H., Bay City, Mich.: Steamers—J. P. Donaldson, Capt. James Connelly, Engineer John Fettig; Maine, Capt. R. Burrington, Engineer Joseph Grandson. Barge—A. W. Wright, Capt. Thomas Thorkildsen.

Vance & Co., David, mngrs. Inter-Ocean Navigation Co., Milwaukee, Wis.: Steamers—Maryland, Capt. Timothy Kelley, Engineer M. Conley; Manchester, Capt. Ralph Nutting, Engineer James Grant.

Vance & Co., David, mngrs. Milwaukee Steamship Co., Milwaukee, Wis.: Steamers—F. L. Vance, Capt. D. L. Vail, Engineer E. Jahn; R. P. Flower, Capt. Everet Zwemer, Engineer Daniel Darcey.

Acme Steamship Co., Duluth, Minn.: Steamers—Augustus B. Wolvin, Capt. J. W. Norcross, Engineer Theodore A. Meyers; James C. Wallace, Capt. Frank C. Rae, Engineer Andrew Haas.

Olga Transportation Co., Tonawanda, N. Y.: Steamer—John C. Pringle, Capt. James Brines, Engineer Edward Staley. Schooners—Sweetheart, Capt. B. McDermott; Unadilla, Arvit Ohman.

Loud, H. N., Au Sable, Mich.: Steamers—John B. Ketcham 2nd, Capt. Martin Christy, Engineer George H. Bowen; Kongo, Capt. Charles E. Barnes, Engineer A. W. Carlisle.

Dunkley-Williams Co., Chicago, Ill.: Steamer—Iroquois, Capt. Frank Swails, Engineer J. O. Adams; City of South Haven, Capt. ———, Engineer M. F. Madden.

Crosby Transportation Co., Muskegon, Mich.: Steamers—Nyack, Capt. John H. Huff, Engineer Karl Hallberg; Naomi, Captain Thomas Traill, Engineer B. J. Hopkins.

Keith & Co., J. G., Chicago, Ill.: Steamers—Ira H. Owen, Capt. J. Mulligan, Engineer Hugh Buchanan; Parks Foster, Capt. John Isbester, Engineer M. Crisp.

Vance & Co., David, mngrs. Wisconsin Steamship Co., Milwaukee, Wis.: Steamer—F. Schlesinger, Capt. Edward Brownell, Engineer R. Pipcorn.

Donely, W. E., Saginaw, Mich.: Barges—A. C. Maxwell, Capt. J. N. Garlock; Katie Brainard, Capt. W. H. Hagerty.

Lakeside Steamship Co., Duluth, Minn.: Steamer—Alfred Mitchell, Capt. A. R. Beall, Engineer Joseph Vally.

Osborne, Wm., Duluth, Minn.: Tug—Corona, Capt. Arthur S. Osborn, Engineer Alfred Baker.

McCormick, H. W., Bay City, Mich.: Barge Oneonta, Capt. Alex. McCormick.

FREIGHT SITUATION

The weather during the past few days has been extremely favorable to the movement of ore and the dock companies report that it is moving freely to the furnaces. There were approximately 5,600,000 tons on the Lake Erie docks at the close of navigation last year, and unquestionably if the opening of navigation should be delayed this year, the docks will be fairly bare on May 1. It is expected, however, that navigation will open about April 15 so that considerable movement will have taken place before May 1 of the present year. As stated in last week's issue, so far as Lake Erie docks are concerned the conditions are expected to be the same on May 1 of this year as on July 1 last year.

More ore will be moved by contract this year than ever before and any speculation as to the wild ore rate at the present time is premature. The contract rates are 75 cents from the head of the lakes, 70 cents from Marquette and 60

cents from Escanaba. As far as known there has been no wild or single trip charters made as yet, but when they are made they are expected to open at the contract rate. In a season of as full movement as this it would appear as though the wild rate should advance, but unfortunately it has been the history of lake trade that whenever it opens strong with a good free movement it lessens perceptibly by the middle of the summer. It, therefore, remains to be seen whether the wild rate will go to 85 cents as some shrewd observers are predicting.

As far as can be ascertained Mr. J. C. Gilchrist is the only vessel owner that has actually taken coal contracts, although others have given options on their vessels to the shippers. Coal contract rates are the same as last year, 35 cents to the head of the lakes and 45 cents to Milwaukee. The hard coal rate has opened at 30 cents from Buffalo to the head of the lakes and 40 cents to Milwaukee which is the same rate as last year and quite a number of vessels are already loaded with first cargoes.

Vessel owners are receiving the benefit of competition of the fuel trade this year. When Mr. Martin Mullen entered the firm of M. A. Hanna & Co. it was predicted it meant competition with the Pittsburg Coal Co. The rate of \$2.10 has now been fixed for fuel coal which is 50 cents per ton less than the rate charged last year. Whether the differential of 10 cents which exists between fuel and cargo coal will be abolished remains to be seen but the differential seems to be lost in the drastic reduction of prices.

The executive committee of the Lake Carriers' association is now in conference with representatives of the Firemen's union which have demanded an increase of \$10 per month. An agreement has been reached on all conditions except the wage schedule, but it is not likely that the increase in wages will be allowed. Following this will come the important conference between the longshoremen and the dock managers on Monday next when a demand will be made for more wages and shorter hours for labor. The dock managers will endeavor to extend last year's schedule over the present year.

GRAIN SITUATION AT DULUTH

Duluth, March 22.—Grain receipts are picking up some and for the week have been 430,000 bu. Of this 267,000 bu. have been oats, which is coming in remarkably fast just now. The stock of oats on hand increased this week by 251,000 bu. and is now about as large as that of wheat. Mills are bidding a little better for wheat and are showing more activity. Flax is in demand from the interior and there were shipments this week of 89,000, making an increase for the week of about 50,000. No flour is yet coming up from Minneapolis for storage and spring lake shipment, and there is some doubt among vessel agents as to the early movement. It is a fact that usually it is well under way by this time. A prominent vessel man who has been in the east for some time, and has been sizing the situation there and here said today: "The spring business looks tame. There is a little wheat to go out, and only about 500,000 bu. have been chartered so far. There are about 4,000,000 bu. of oats and twice as much flax. The oats will not be hurried and the flax is owned by the American Linseed Co., which will move it when conditions warrant, and when it can be handled better east than at Duluth, and much of it will stay over till the new crop, at any rate, if no longer."

There has been some talk of shipments of Duluth wheat to Chicago on May account, but it is said this will hardly take place, for the Chicago shorts are said to have come to the conclusion that Duluth contract wheat is not up to grade, that it will merely skin through. They claim it is frosted and looks poor. Probably these remarks are a gross exaggeration of the facts though inspections at both Duluth and Minneapolis may have been a trifle less vigorous than usual.

AROUND THE GREAT LAKES

Capt. Thomas Kennedy has been appointed grain superintendent at Buffalo.

The Rochester & Pittsburg Coal Co. has put nine new pockets in its fueling dock at Buffalo.

Capt. Paul Howell, formerly district captain of the masters and pilots, is in Buffalo looking after repairs upon the Bradley fleet.

E. L. Hedstrom is building a new trestle with pockets for fueling purposes in the Blackwell canal near Michigan street bridge, Buffalo.

The Dunkley-Williams Co., of Chicago, has purchased the steamer Iroquois, which was built by the Craig Ship Building Co. of Toledo.

Joseph McLean, Bay City, Mich., has received a contract to build a new dwelling for the lighthouse keeper at the mouth of Saginaw river.

Capt. W. H. Moody and Richard Jollie are at South Chicago looking over the two steamers to be launched for the Pittsburg Steamship Co.

The steamer M. T. Greene has been purchased by the Erie & Michigan Railway & Navigation Co. from the Gypsum Transportation Co. for \$30,000.

A new chart in colors of Portage lake and river has just been issued by the United States lake survey office and is now on sale by the Marine Review.

The keel for the steamer Henry C. Frick building at the West Bay City yard of the American Ship Building Co. for the Pittsburg Steamship Co. was laid this week.

Capt. George Robarge, McDonald, Alva Keller, Walter Hamilton, William Irwin and C. E. Burham are at Buffalo looking after repairs to the vessels they are interested in.

The Milwaukee life-saving station will resume work for the season on the first of next month. Orders to that effect have been received from Supt. Charles Morton of that district.

At the annual meeting of the Buffalo Lumber Exchange, George B. Montgomery was elected president, Orson E. Yeager, vice president, and Knowlton Mixer, secretary and treasurer.

Several steamers are laid up at the Tift farm, Buffalo, holding grain cargoes that are in bond and are unable to get to elevators to discharge their cargoes on account of shoal water and heavy ice.

At the meeting of Inland Lloyds last week the following officers were elected: President, J. S. Gadsden, Chicago; secretary and treasurer, A. H. McDonnell, Detroit; chief inspector, Capt. A. B. Drake, Buffalo.

The locks of the Lachine canal will be operated by electrical machinery. The work will be done by the Dominion government itself under the direction of Mr. Ernest Marceau, superintendent of the Quebec canals.

The tug Reliable, owned by Capt. John S. Quinn of Detroit, has been sold at sheriff's sale in Windsor to the Silverman & Quinn Wrecking Co. for \$525. It is said the price obtained does not cover the claims against the boat.

Fire broke out in the forward cabin and hold of the steamer George T. Hope, moored at the Erie docks at Cleveland last week. F. A. Pitcher, the keeper, had a narrow escape from suffocation. The steamer was not badly damaged.

The Niagara Navigation Co. has given an order to the Canadian Ship Building Co. for a twin screw steamer to be of the same length as the Chippewa. She will be placed on the Lewiston-Toronto route, but is not to come out until 1906.

Anyone who can furnish any information of the whereabouts of William Hudson will do a favor by communicating with Esther M. Boyd, No. 320 Wood avenue, Muskegon, Mich. When last heard from he was captain of the George Dunbar.

C. H. Nicholson, Sarnia, Ont., traffic manager of the North-

ern Navigation Co., visited Toledo last week relative to the plans of the company for planning a new line of passenger steamers on the Toledo-Georgian Bay route during the coming season.

The Board of Trade of Sarnia last week gave a dinner in honor of the managers of the Reid Wrecking Co., promoters of many of Sarnia's industries. The dinner was an expression of thanks for the good will which the Reids have shown in the building up of Sarnia.

Capt. John Mitchel of Cleveland has decided to change the name of the steamer H. C. Frick to E. A. S. Clark. One of the four steamers now building for the Pittsburg Steamship Co. is to be named Henry C. Frick. Mr. Clark is president of the Laskawanna Steel Co.

At a meeting of the Association of Lake Lines held in Buffalo this week it was announced that the west bound lake and rail rates will go into effect on April 10. The railways having lake connections will therefore receive freight for transit by lake from Buffalo on that date.

H. J. Pauly of Milwaukee has bought the steamer Harlem from the Jenks Ship Building Co., Port Huron, for \$100,000. The Harlem went ashore in Georgian Bay last December. It is understood to be the plan to lengthen her to increase her carrying capacity to 5,000 tons.

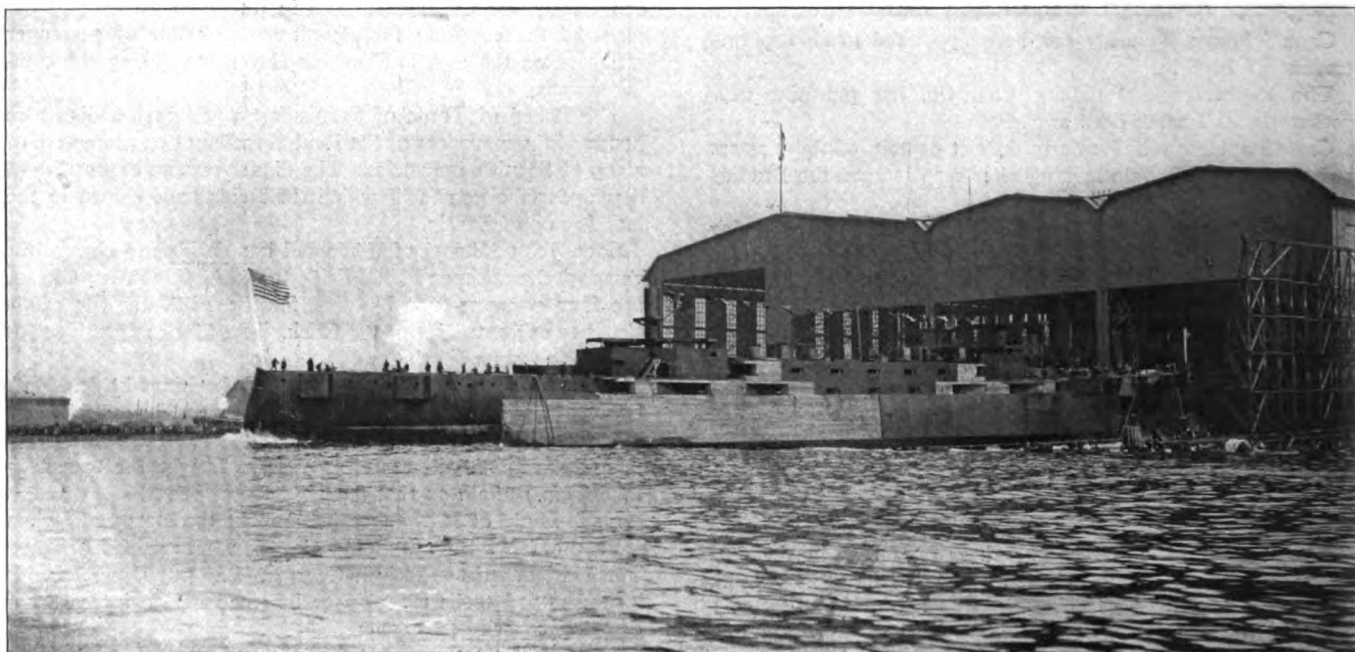
The opening of passenger navigation on the great lakes is somewhat delayed this year owing to the presence of ice in the channels. Navigation between Detroit and Cleveland was opened on March 20 last year, but it will probably be April 1 before it is opened this year.

Toronto is the headquarters of the new shipping company known as the Montreal & Lake Erie Steamship Co. The incorporators are James Carruthers, Charles Arthur Jacques of Montreal; J. B. Hill of Ottawa; W. D. Matthews, F. D. Benjamin, Sidmund Samuel, C. W. Baird and George Summerville of Toronto.

Capt. C. P. Hart of the Hart Steamboat line has sold his interest in that business to L. C. Shilling and will retire from active life. By the transfer the Maloney-Roulette Steamboat line will be merged with the Hart line, making one concern. The steamers will be the Harriet A. Hart, Eugene C. Hart, Fanny C. Hart, and the City of Green Bay. The Hart Steamboat line was founded in 1873 with a capital of \$140,000, by captains H. W. and C. B. Hart. Since the death of Capt. H. W. Hart the business has been conducted by Capt. C. B. Hart.

The annual meeting of the Collingwood Ship Building Co. was held last week. The attendance of shareholders was not large. Those present agreed, as a majority had previously done, to accept a proposal made regarding the readjustment of the stock and the reorganization of the company. Directors were then appointed to hold office until the new company is organized. Those appointed were: A. McDougall of Duluth; Charles Cameron, Capt. P. N. Campbell, E. R. Carpenter, and J. M. Hopkins of Collingwood; H. B. Smith of Owen Sound; T. Long of Toronto, and N. Dumont of Barrie. At a subsequent meeting of the directors J. M. Hopkins was elected president and T. Long, secretary and treasurer. It is expected that a transfer of the new company will take place early in May.

The monster floating dry dock built by the Maryland Steel Co., Sparrow's Point, Md., for the United States government is shortly to be towed to Subig Bay, P. I. The dock is 500 ft. over all, 100 ft. wide and 42 ft. high, and is capable of lifting a ship drawing 35 ft. of water. The displacement of the dock is 11,000 tons and cost \$1,124,000. The presence of this dock at Subig Bay will make the United States navy independent of the foreign docking facilities of Hong Kong and other far eastern ports. The dock will be towed to the Philippine Islands by two steamers, but the route has not yet been decided upon.



THE ARMORED CRUISER WASHINGTON JUST AS SHE TOOK THE WATER.

Launch of Cruiser Washington

The first class armored cruiser Washington was successfully launched at the yard of the New York Ship Building Co., Camden, N. J., on Saturday last in the presence of hundreds of distinguished guests. The Washington was christened by Miss Helen Stuart Wilson, daughter of the Hon. John L. Wilson, ex-senator from the state of Washington. She was accompanied by Miss Maude Wadsworth of Spokane, Wash., Miss Ruth Stone of Walla Walla, Wash., and Miss Grace Denny of Seattle, Wash., and ten other young ladies from the school which Miss Wilson attends in New York. There was not the slightest hitch in the launch. As soon as President De Courcey May gave the signal to release the trigger the great cruiser began to slide towards the river, slowly at first but gaining momentum rapidly.

At the conclusion of the launch luncheon was served to the launching party and invited guests which embraced a great many prominent in public life.

Among those from the navy department at Washington were: Assistant Secretary of the Navy Charles H. Darling, representing Secretary Morton; Herman Gauss, John Nordhouse, B. F. Peters, S. W. B. Diehl, judge advocate general; E. P. Hanna, Pickens Neagle, H. T. B. Harris, paymaster general; Samuel McGowan, Admiral George Dewey, Rear-Admiral Washington Lee Capps, Rear-Admiral N. E. Mason, Rear-Admiral H. W. Manney, Rear-Admiral George A. Converse, Capt. Seaton Schroeder, Rear-Admiral Mordecai T. Endicott, Rear-Admiral Charles W. Rae, Sydney Besselivere, Rear-Admiral F. J. Higginson, Constructor Joseph H. Linnard, Constructor D. W. Taylor, Rear-Admiral C. E. Clark, Rear-Admiral C. S. Sperry, Rear-Admiral William T. Swinburne, Rear-Admiral William Swift, Rear-Admiral R. Wainwright.

Other Washington officials—Eugene Tyler Chamberlain, commissioner of navigation; George Uhler, supervising inspector-general; Gen. Charles F. Humphries, quartermaster-general; Maj. Chauncey B. Baker, quartermaster; Maj. John B. Bellinger, quartermaster; Capt. Joseph T. Crabbs, quartermaster; Capt. C. T. Hutchins, Capt. U. Sebree, naval secretary lighthouse board.

Naval attaches—Senor Com'dr Luis A. Lan, Argentine Republic; Lieut. Com'dr de Faramond de Lafojole, France; Com'dr Hans-Georg Hebbinghouse, Germany; Capt. Dudley Ranson de Chair, Great Britain; Lieut. Carlo Pfister, Italy; Com'dr Alexandre Boutakoff, Russia; Lieut.-Com'dr Isam Takeshita, Japan.

Governors—Albert E. Mead, Washington; Edward C. Stokes, New Jersey.

Senators—Addison G. Foster, Tacoma; Levi Ankeny, Walla Walla; P. C. Knox, Washington; Boise Penrose, Philadelphia; John Kean, Elizabeth, N. J.; John F. Dryden, Newark, N. J.; William P. Frye, Washington; Jacob H. Gallinger, Washington.

Representatives—Wesley L. Jones, Yakima; Francis W. Cushman, Tacoma; William E. Humphrey, Seattle; Allan Benny, Bayonne, N. J.; Charles N. Fowler, Elizabeth, N. J.; John J. Gardner, Atlantic City, N. J.; Benjamin F. Howell, New Brunswick, N. J.; William Hughes, Paterson, N. J.; H. C. Loudenslager, Paulsboro, N. J.; Allan L. McDermott, Jersey City, N. J.; R. Wayne Parker, Newark, N. J.; William H. Wiley, East Orange, N. J.; Ira W. Wood, Trenton, N. J.; A. G. Dayton, Washington; Gen. C. H. Grosvenor, Washington; John Dalzell, Washington; Charles H. Littlefield, Washington.

The leading features of the Washington are: Length on load water line, 502 ft.; breadth, extreme at load water line, 72 ft. 10½ in.; displacement on trial not more than 14,500 tons; mean draught to bottom of keel on trial displacement, 25 ft.; maximum displacement, full load condition, with coal bunkers full, full supply of stores, ammunition on board and water in boilers, of 15,950 tons; mean draught at maximum load, 27 ft.; coal carried on trial, 900 tons; total coal bunker capacity, 2,000 tons; steaming radius at 10 knots per hour, about 6,500 knots; steaming radius at full speed, about 3,100 knots.

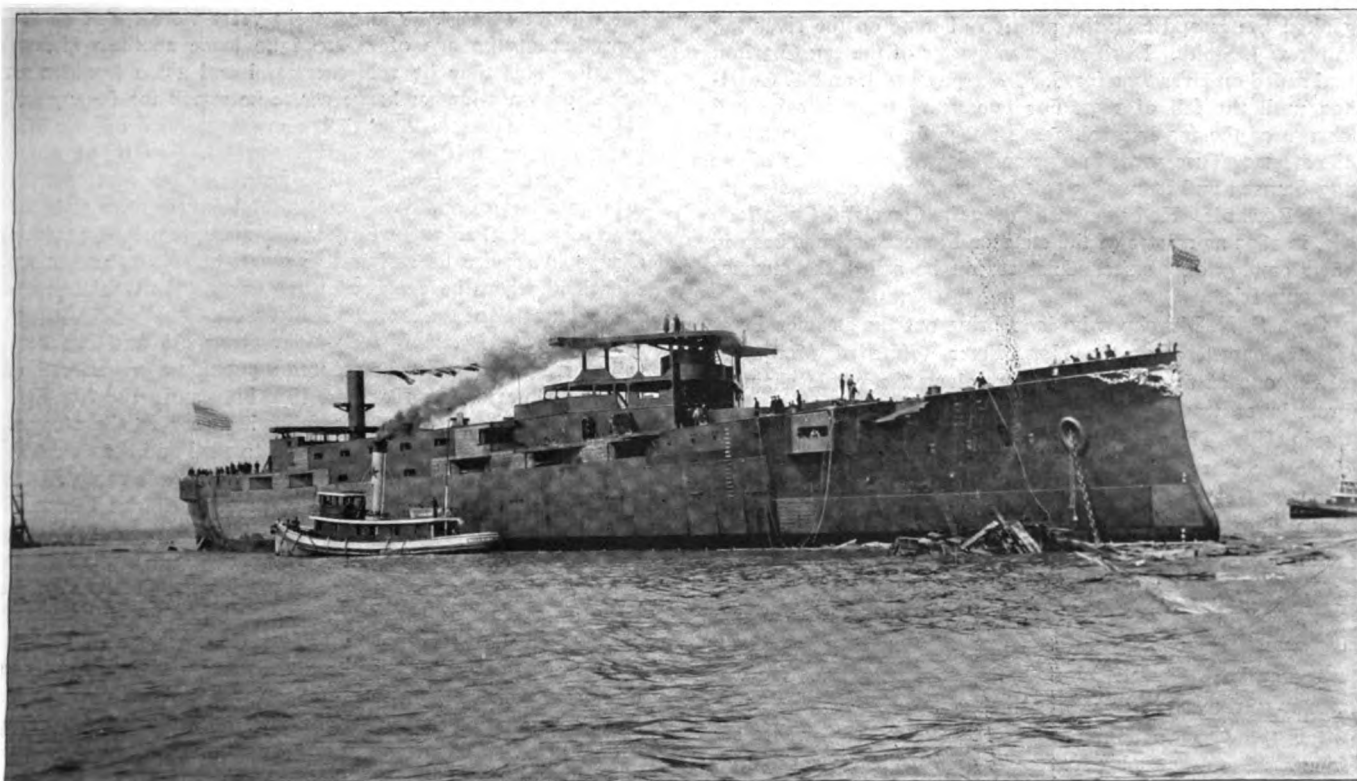
The hull is protected by a 5-in. belt of armor extending from 5 ft. below the normal water line to the upper deck in wake of 6-in. guns; this armor extending completely to the bow and stern near the water line to form a water line belt, being reduced in thickness at the ends to 3 in. Extending

from the gun deck to the protective deck are bulkheads of 5-in. armor which form the forward and after limits of the belt armor. Between the gun and berth decks are similar bulkheads located in wake of the 10-in. barbettes which are fitted on the gun deck and form the forward and after limits of the side armor between the main gun decks. Above the gun deck in wake of the 3-in. battery, 2-in. nickel steel is fitted. The 6-in. guns on the gun deck are isolated by splinter bulkheads of 1½ in. nickel steel, extending continuously across the ship, and 2-in. nickel steel extending fore and aft.

The 10-in. turrets are protected by 9 in. of armor on the sloping face, 7 in. of armor on the sides, 5 in. in the rear and with top plates of 2½ in. nickel steel. The barbette armor is 7 in thick in front, reduced to a thickness of 4 in. at the back and below the gun deck where protected by the belt and casement armor. The protective deck, which extends from bow to stern, will be 1½ in. thick on the flat over the engine and boiler spaces, 4 in. thick on the slopes at the sides, extending down to the bottom of the belt armor, 3 in. on the

vessel four of the 6-in. guns can be trained directly ahead or directly astern respectively, so that it is possible to obtain a direct ahead fire with the main battery of two 10-in. guns and four 6-in. guns, and the same number at the stern. The 3-in. guns will be mounted as follows: Six in sponsons on the gun deck, six in broadside on the gun deck and ten in broadside on the main deck. The 3-pounders and smaller guns are mounted on the upper deck, bridges and in the tops.

The ammunition and shell rooms are so arranged that one-half the total supply of ammunition will be carried at each end of the ship. With the increase in battery special care has been required in developing these designs to secure an adequate rate of supply of ammunition from the magazines to the guns. For handling 6-in. and 3-in. ammunition the ships have been provided with a central passage extending completely from the forward to the after magazines, and four side passages at each end to extend a sufficient distance forward and aft to provide for handling the ammunition within the armor protection on



THE ARMORED CRUISER WASHINGTON JUST AFTER SHE TOOK THE WATER.

[Building by the New York Ship Building Co., Camden, N. J.]

slope, forward and aft. A cofferdam 30 in. thick will be worked from end to end of the vessel between the protective and berth decks.

The armament will be as follows: The main battery will consist of four 10-in. breech loading rifles and sixteen 6-in. breech loading rifles. The secondary battery will have twenty-three 3-in. rapid-fire guns, twelve 3-pounder semi-automatic guns, two 1-pounder automatic guns, two 1-pounder rapid-fire guns, two 3-in. field pieces, two machine guns of .30 caliber and six automatic guns of .30 caliber.

The 10-in. guns will be mounted in two elliptical, balanced turrets protected by armor as described, and they will be under complete electrical control as will also be their hoists and their loading and training mechanism. The 6-in. guns will be mounted four in independent armored casements on the main deck, the remainder in broadside on the gun deck, all on pedestal mounts, the back and side plates of the casements on main deck being of 2-in. nickel steel. At each end of the

the decks above. All of these passages are at the level of the upper deck platform and such quantity of both 6-in. and 3-in. ammunition is stowed at this level as would probably be required in any action. The remaining ammunition is stowed where it can readily be whipped up by hand when time is available from the lower to the upper platform.

For handling ammunition along the central passage there will be ammunition conveyors, which are nothing more than traveling platforms onto which ammunition can be loaded at one end and delivered abreast the various ammunition hoists at different points in its travel. Provision has been made by means of power hoists to handle the 6-in., 3-in. and 3-pounder ammunition at the rate of seven pieces per minute.

The propelling engines will be of the vertical, twin-screw, four-cylinder, triple-expansion type of a combined indicated horse power of 23,000. The steam pressure will be 250 lbs. and the stroke 4 ft. The engines will be located in two separate watertight compartments. Steam will be supplied by a battery of Babcock & Wilcox boilers.

THE CLEVELAND CLIFFS IRON CO.'S MASTERS

It has been observed that those who commune with nature and live closely to it, whose life in fact is made up of daily intercourse with the elements attain a certain simplicity of character and serenity of mind. Such a person is open and generous in disposition and almost always without guile. These observations are especially true when directed to the men who command the vessels of the active fleet on the great lakes. With the fleets as units the Marine Review proposes from time to time to publish group pictures of the masters in command of vessels. In the present issue it publishes the masters of the vessels of the Cleveland Cliffs Iron Co.

Capt. John M. Johnston, who is to command the new steamer William G. Mather when she comes out, was born in Sweden and began sailing on salt water at the age of twelve years. His career on the great lakes began in 1872 when he shipped as wheelsman with Capt. Harry Zealand on the propeller East, trading between Montreal, Chicago and Duluth. From 1877 to 1878 he was master of the steam barge Vanderbilt. He sailed on Canadian steamers until 1883 when he came over to the United States and took the position of mate on the river tug Andrew J. Smith. In 1884 he was master of the tug Charlton and sailed on river tugs for S. A. Murphy and J. and T. Charlton until the fall of 1891. For two years thereafter he had charge of the tug line ashore. In 1892 he became master of the steamer Tuscarora; in 1893 and 1894 he was master of the tug Samson and from 1895 to 1898 was master of the steamer Wm. Edwards. He began sailing for the Cleveland Cliffs Iron Co. in 1899 as master of the steamer Pioneer and has been in their employ ever since. Last season he sailed the steamer Presque Isle.

Capt. S. N. Murphy, who is to bring out the steamer Peter White, named after the Hon. Peter White of Marquette, Mich., one of the finest characters along the whole chain of great lakes, was born at Canda, Ont., in 1847 and began sailing in 1862. The various vessels which he has commanded include the steamer D. M. Willson, schooner Minnehaha and steamers George Spencer, Casota, Charlemagne, Tower, Frontenac, Presque Isle and Angeline.

Capt. H. H. Parsons, who will bring out the steamer Presque Isle this year, was born in Kingston, Ont., of American parents in 1872. He began sailing before the mast in sailing vessels in 1886, and in 1895 was appointed master of the schooner J. E. Card which he sailed for two years. He was master of the schooner Porter during 1897 and 1898 and took the Porter to the Atlantic coast in the fall of 1898 where she foundered during the big November gale of that year, the crew being rescued by a Gloucester fishing schooner. In the spring of 1899 he was appointed master of the steamer V. Swain and in the following spring went with the Cleveland Cliffs Iron Co. He sailed the steamer Cadillac two years and the Choctaw two years. Last season he was in the Pontiac.

Capt. Corydon E. Sayre, master of the steamer Centurion was born on a farm near Mason, Mich., Oct. 11, 1864. He is of Anglo-American parentage, his ancestors being New England settlers of Colonial times. He worked on a farm until he was seventeen years of age and then followed the carpenter and joiner trade, qualifying himself in the meantime as teacher of the district school of Ingham county, Mich. The residence at Mason of a family well known as lake navigators was the incentive that prompted him to change his vocation and become a sailor. Accordingly with no knowledge whatever of life on the water he went to Chicago in the spring of 1888 and shipped on a lumber barge as deck hand, subsequently serving as fireman, watchman and wheelsman in package freight and ore carrying steamers. In 1892 he became second mate, filling this position on the steamer Pontiac and in 1893 was promoted from second mate to first mate of the steamer Hesper. In the

spring of 1897 he was appointed master of the steamer I. J. Boyce, entering the steel rail trade under the management of Mr. J. S. Keefe in whose employ he remained the following season as master of the steamer Adella Shores. In 1899 he had command of the steamer Jesse H. Farwell then under charter of the American Steel & Wire Co. with Mr. W. C. Richardson as manager. During the winter of 1900 he entered the employ of the Cleveland Cliffs Iron Co. as master of the steamer Andaste, which position he has filled for the past five years. This year he will sail the steamer Centurion.

Capt. Fred L. Tonkin was born in Cornwall, England, in November, 1860, on the coast of the English channel near the Lizard. He therefore came by a seafaring life very naturally. When he was eleven years old his father was killed in a railway accident and his mother brought her six children to the United States, the eldest being at that time, only twelve, believing that they would have a better chance to thrive in this country than at home. Shortly after his arrival in this country Tonkin's maritime instinct caused him to seek employment on one of the Graham & Morton steamers at Chicago, but without success. The next six years were spent on the farm but at the age of eighteen he made another attempt to sail. This time he was successful and got a position as watchman on a lumber barge where he stayed for four years. He left the lakes in 1893 to become a member of the life-saving station at Chicago during the world's fair at which employment he remained for one year. He then entered the passenger service on Lake Michigan and remained as mate for nine years. Realizing that further advancement meant complete change in service he resigned to go as mate on the steamer Maryland where he remained three years. He was then appointed master of the steamer Kaliyuga.

Capt. S. A. Lyons is forty-eight years old and has been sailing since 1869 when he secured a position as wheelman on the tug Ontario. In 1871 and 1872 he was in the tug Kate Moffatt and then shipped the following year in the steamer Wenona. He was ashore from 1876 to 1878 and then went as wheelsman on the Dove. In 1880 he shipped as mate in the Northern and in 1881 went on the schooner Nelson Bloom of which he became master in 1884. He then went on the schooner E. T. Ewen and sailed on her for a few years, in 1889 taking command of the schooner Hawgood. In 1892 he went on the Mark Hopkins and sailed her for four years. He entered the Cleveland-Cliffs Iron Co.'s service in 1876 as master of the steamer Pioneer and commanded her for three years and then went on the Pontiac for one year. He was on the Centurion for five years and now goes on the Angeline.

Capt. U. S. Cody was born in Sombra, Ont., in 1867 and began sailing in 1884. For the past seven years he was employed by Corrigan, McKinney & Co., and was in the steamers Quito and Iron Chief. Incidentally it might be mentioned that in the fall of 1903, after laying up his steamer he was engaged by the Pere Marquette Railway Co. to take their new car ferry No. 20 which had just been finished at the Cleveland yard of the American Ship Building Co. to Ludington, Mich. Navigation was at that time closed and all lights and buoys removed. He left Cleveland in the No. 20 on Dec. 14, arriving at Ludington on Dec. 24, encountering ice most of the distance. He will sail the Andaste for the Cleveland Cliffs Iron Co. this year.

Capt. Thomas Kimmitt is forty-five years old and started as a boy on the schooner Mary Dattle, sailing as seaman and second mate on her until 1879. In 1880 he sailed on the schooner Lisgar and for the next three years served as mate on the schooner Glinisser. In 1885 he was second mate of the steamer Tecumseh and from 1886 until 1892 he served as mate on the schooners Muir, Edward Blake, Augusta, Denson, and G. M. Neelson. He became master of the schooner Maggie

(Continued on page 32.)

Masters of Cleveland Cliffs Iron Co.'s Fleet



Top row reading from left to right: Capt. S. N. Murphy, steamer Peter White; Capt. E. H. Bennett, steamer Falcon; Capt. J. M. Johnston, steamer Wm. G. Mather.

Second row reading from left to right: Capt. T. E. Murray, steamer Pontiac; Capt. F. L. Tonkin, steamer Kaliyuga; Capt. F. D. Perew, steamer Choctaw.

Third row reading from left to right: Capt. Wm. H. Hoffman, steamer Cadillac; Capt. C. R. Ney, steamer Pioneer; Capt. S. A. Lyons, steamer Angeline; Capt. H. H. Parsons, steamer Presque Isle.

Bottom row reading from left to right: Capt. C. E. Sayre, steamer Centurion; Capt. U. S. Cody, steamer Andaste; Capt. C. A. Anderson, steamer Frontenac; Capt. Thomas Kimmitt, schooner Chattanooga.

Merchant Marine League Statement

When the coast gets to the point of manufacturing ships, which is practically the state of the industry on the great lakes, the United States will have a merchant marine worthy of the name. Mr. James C. Wallace, president and general manager of the American Ship Building Co., in a recent talk said that his company had reached a point of such perfection of system that it no longer built ships but manufactured them. The great steamer James C. Wallace was launched eleven weeks

is the reason why the lake yards can build a leviathan in a quarter of a year.

To bring this about is one of the missions of the Merchant Marine League of the United States which was organized in Cleveland a few months ago and which has already attained membership in half the states of the union, and has elected vice-presidents in four of them—New York, Pennsylvania, Ohio and Michigan. The league has recently issued the fol-



COLUMBIA: "And they said the West was not interested in shipping."

after her keel was laid; and granting no delays for material the company is now prepared to bring a 500-ft. steamer into the launching stage in seven weeks. It practically did this with the Philip Minch, launched last Saturday, which was only fifty-two days on the stocks. The ship yards of the great lakes have, within their restricted field, made ship building quite as standard an industry as it is in Britain, which has gained ripe experience by building ships for the whole world. If the American ship on the high seas would only be given a fair field it would not be long before the ocean would be dotted with the stars and stripes and American ship yards be turning out craft quite as economically as British yards. They would then have enough practice to permit the various yards to specialize, which is the secret of British success, and

lowing argument in favor of the promotion of shipping of the general government:

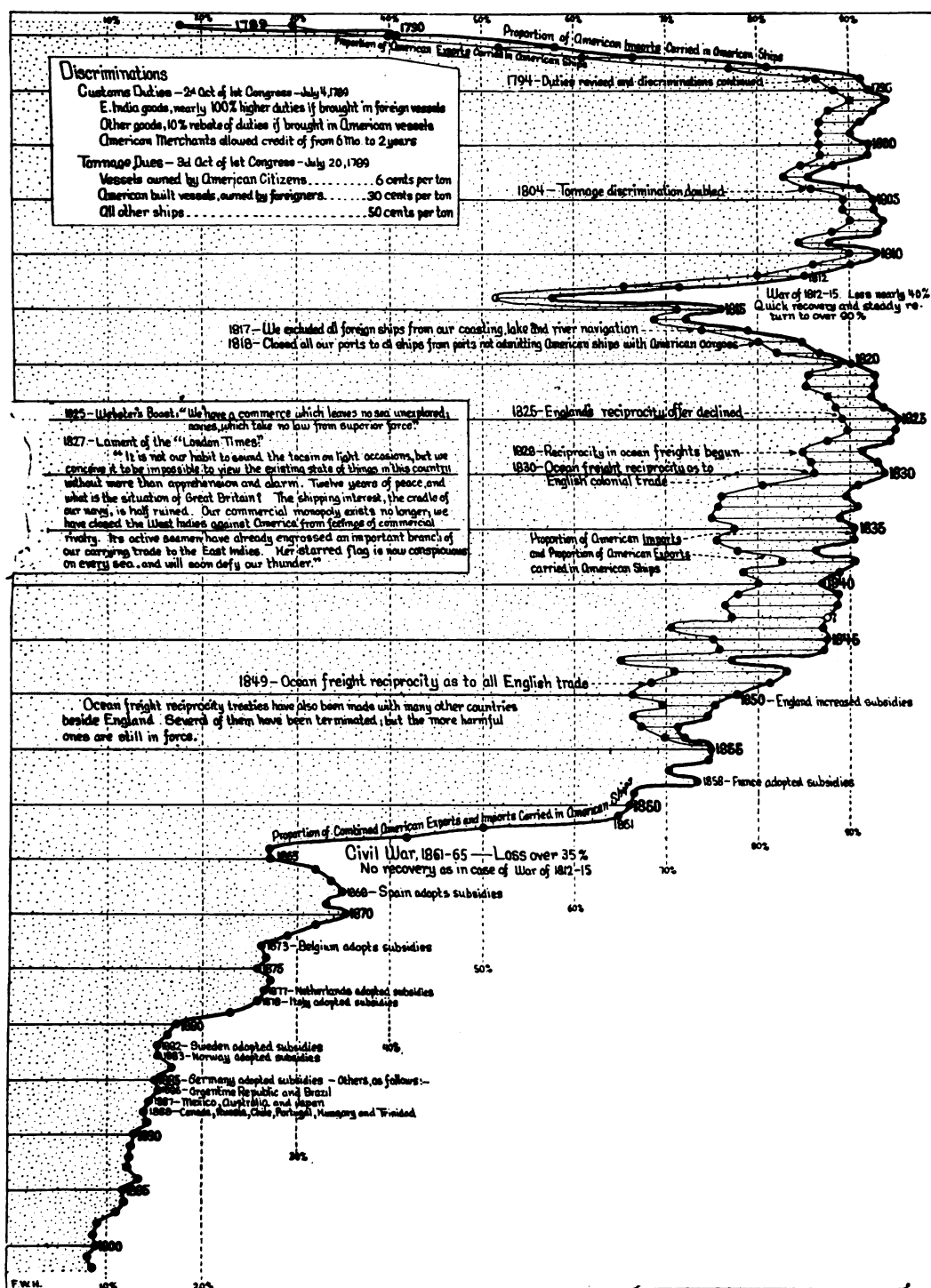
The Merchant Marine League is the outgrowth of a conviction on the part of a number of leading business men of the central states, none of whom are in any way, directly or indirectly, interested in ocean ship building or ship-owning, that this great question has never received a just measure of attention from our national law makers.

It has been regarded both as a partisan and sectional question at all times and the great element of patriotism and advantage to the country as a whole almost entirely overlooked.

We pay now from one hundred and fifty to two hundred million dollars a year to foreign ships for carrying our commerce

and this increasing flow of wealth out of this country could be quickly and cheaply stopped by the expenditure of a very little money and thought in the effort to assist in building up a merchant marine carrying the stars and stripes that would

whole subject and took the testimony of leading business men in all parts of the United States. As a result they framed a most admirable report accompanied by a bill to carry into effect its recommendations.



GRAPHIC CHART SHOWING THE DECLINE OF AMERICAN SHIPPING IN THE FOREIGN TRADE.

[Reproduced from Success by permission.]

serve the purpose likewise of urging forward our commercial relations with foreign countries as well as merely carrying our products.

Our exports last year exceeded \$1,300,000,000. They were greater than any other nation and yet our own ships carried less than 9 per cent of all this trade.

A congressional committee appointed from the members of both houses last year, and consisting of six Republicans and four Democrats, made a very thorough investigation of this

This bill provided:—

First—For the creation of an American corps of naval volunteers composed of the officers and seamen upon ships carrying the American flag and from whose ranks in time of peace or war, could be recruited officers and seamen to man the United States navy, which is even now, as every one knows, short-handed and suffering for lack of efficient crews.

Second—The establishment of a dozen new American steamship lines to as many different parts of the world, where now

we have none, and the trade which should be ours is in the hands of foreign companies.

Third—An increase in our receipts from tonnage dues to provide a good portion of the revenue necessary to take care of the expenses incurred by other provisions of the bill.

Fourth—Subventions or payments to American freight ships, sail or steam, engaged in the foreign trade exclusively, not mail carriers.

This bill commanded the support of many members of both parties in congress, and it was only because of the shortness of the session and the pressure of appropriation bills that it was not considered before adjournment.

In every way the bill would seem to overcome successfully all the objections that have been made against previously proposed legislation and meet every argument as far as possible that has been urged for or against government action.

It is the most popular measure now pending before congress, and with a little effort on the part of patriotic citizens generally, it is felt that it can be enacted into a law early in the next session of congress.

This will mean the utilization of the resources of our mines, forests, farms, furnaces, mills, ship yards, etc., in the building of the necessary ships and machinery to equip a merchant marine of which every American can be proud, instead of ashamed.

It would keep here to be employed over and over again the one hundred and fifty to two hundred million dollars now going to foreign countries for carrying our products.

It would give employment to thousands of American mechanics and workmen in every state of the union.

It would reinforce and be a valuable adjunct to our navy and give us merchant ships and merchant seamen that would create a resource of defense and that every president from Washington to Roosevelt has regarded as being essential to our national safety.

And, it would be an advantage, a source of strength, revenue and power that would redound in many ways to the safety and prosperity of our whole country and its citizens.

With this before us as the object to be attained, the Merchant Marine League invites the sympathy and support of every patriotic citizen.

The Cleveland Cliffs Iron Co.'s Masters

(Continued from page 28.)

in 1892 and sailed her for several years. He joined the Cleveland Cliffs Iron Co.'s service in 1902, serving on the Kaliyuga and was given command of the schooner Chattanooga in 1903 which vessel he has sailed since.

Capt. F. D. Perew was born in Ashtabula in 1865 and began sailing in 1878 as boy on the schooner A. C. Maxwell. He was promoted to master of the J. N. Hutchinson in the fall of 1888 and was in the J. B. Lyon as master in 1891. From 1892 until 1903 he sailed for Captains James and John Corrigan in various boats. In 1904 he resigned from Mr. Corrigan's employ to go into the steamer P. P. Pratt.

Capt. T. E. Murray was born at St. Catharines, Ont., in 1857 and began sailing in 1870 on sailing vessels. He has been master of the schooners S. A. Andrews, Bessie Barwick and Edward Blake and the steamers Mazeppa, Lakeside, Garden City, Columbian, Carmona, E. S. Pease, Kaliyuga and Frontenac. He has been with the Cleveland Cliffs Iron Co. for five years.

Capt. E. H. Bennett began his sailing career in the employ of the Mills Transit Co. of Port Huron, where he remained for five or six years. He then went with the Corrigan fleet and sailed in vessels of that fleet until last spring when he entered the employ of the Adams Transit Co. of Detroit and served as first officer of the steamer Thomas Adams. He goes this year

in the steamer Falcon which is the first vessel that he commands.

Capt. Wm. H. Hoffman was born in Romeo, Mich., on June 17, 1871, and began sailing in 1886. He received the position of mate at the age of twenty-one, the last steamer of which he was mate being the Maunaloa, the last four seasons sailing the steamer Saginaw owned by C. W. Kotcher of Detroit. This year he goes in the Cadillac.

Capt. C. A. Anderson was born in Sweden in 1875 and began sailing on the great lakes in 1892 at the age of eighteen. He entered the employ of the Cleveland Cliffs Iron Co. in 1899 as mate on the steamer Pioneer. He received his first appointment as master in 1902, sailing the Falcon, and in 1903 and 1904 sailing the Cadillac.

Capt. C. R. Ney was born in St. Clair county, Michigan, in 1869 and started sailing in 1884. He has sailed the steamer Fred Kelly for Mr. M. A. Bradley and the steamer Pioneer for the Cleveland Cliffs Iron Co.

PERSONAL

Mr. O. P. Letchworth, president of the Pratt & Letchworth Co., Buffalo, and vice-president for New York of the Merchant Marine League of the United States, sails on Saturday of this week on the Princess Irene of the North German-Lloyd Line for a two months' vacation in Europe.

Mr. G. D. Ellis formerly with the Northern Navigation Co. at Sarnia and during 1904 the manager of the Turbine Steamship Co. at Hamilton, Ont., died in New York recently as a result of injuries received by a fall on the sidewalk there.

Charles M. Schwab, president of the Bethlehem Steel Corporation, will sail for Europe about April 15, and while abroad will confer with officials of the Russian government regarding the replacement of the Russian navy.

Capt. Henry E. Judson, local inspector of hulls at Toledo, has been transferred to Cleveland to succeed Capt. George De Wolf, deceased. An eligible list is now being formed to fill Capt. Judson's place at Toledo.

M. A. Bradley, president and T. F. Newman, general manager of the Cleveland & Buffalo Line, will leave this week for a trip to the Bermuda Islands.

Robert S. Paul formerly of the Morgan Line, is now the chief engineer of the Great Northern Steamship Co.'s steamer Dakota.

John Haig for many years Lloyd's surveyor at Philadelphia, has gone to California to accept a position with the Standard Oil Co.

F. Percy Smith has been appointed secretary of the Richelieu & Ontario Navigation Co. of Montreal.

The Page Engineering Co., Baltimore, representing the Pennsylvania Iron Works Co. of Philadelphia, builders of the Globe marine gasoline engine, have received an order from Andrew Woodall of Georgetown, Md., for a four-cylinder 85 H. P. engine to be installed in a barge now building by the Cambridge Manufacturing Co., Cambridge, Md. The Page Engineering Co. have also placed an order for a four-cylinder 100 H. P. Globe engine to be installed in a barge now building for E. V. Stockham, Perryman, Md., by E. J. Tull, Pocomoke, Md.

The new tug George F. Randolph, built by the Baltimore Ship Building & Dry Dock Co., for the Baltimore & Ohio Railroad, underwent a successful trial last week. The Randolph is 120 ft. long, 23 ft. beam and 12½ ft. deep. Her machinery consists of fore and aft compound engines with cylinders 20 and 40 in. diameters by 28 in. stroke. Steam is supplied by a Scotch boiler, 14 ft. 10 in. diameter and 12½ ft. long, equipped with three Morison corrugated furnaces.

ITEMS OF GENERAL INTEREST

Hay & Wright, Alameda, Cal., have just completed extensive repairs to the steamer Lakme.

The transport Buford will undergo repairs at the Union Iron Works before sailing for the orient.

The four-masted schooner Governor Powers was launched this week from the yards of Cobb, Butler & Co., Rockland, Me.

Wm. E. Woodall & Co., Baltimore, Md., sent overboard last week a large open lighter for the Chesapeake Steamboat Co.

The Boston Harbor Towing & Supply Co., 170 Summer street, New York, is to build a 70-ft. power boat for general use.

The Noecker, Rickenbach & Ake Ship Building Co. has been organized with a capital stock of \$125,000, at Camden, N. J.

The Babcock & Wilcox Co. will build the boilers for the armored cruisers Montana and North Carolina, now building at Newport News.

The Harlan & Hollingsworth Co., Wilmington, Del., proposes to make extensive improvements to its plant, including a car shop to cost about \$45,000.

Sawyer Bros., Milbridge, Me., are to build a three-masted schooner for P. A. Calor, Jonesport, Me. The schooner will be 118 ft. long, 32 ft. wide and 10 ft. deep.

The steamer City of Rockland, which went ashore in Penobscot Bay, Me., last August, has been repaired by William McKie, East Boston, and turned over to her owners.

The ferry boat, Ashburnham, building at the yard of William McKie, East Boston, for the Boston, Revere Beach & Lynn Railroad, will be launched in a couple of weeks.

Osner & Storey, Essex, Mass., are to build a new fishing schooner 120 ft. over all, 95 ft. on the water line, 25-ft. beam and 11 ft. 6 in. deep for Capt. Maurice Powers of East Boston.

The W. & A. Fletcher Co., Hoboken, N. J., are building the machinery for the new steel screw ferry boat Rochester of the New York Central & Hudson River Railroad line.

The Sharpley Marine Railway Co., Greenbackville, Va., has just received an order to build a barge 60 ft. long, 14 ft. wide and 4 ft. deep and are negotiating for the construction of two others.

The Master Marine association of Gloucester, composed of the skippers of fishing vessels, have decided to build a towboat to be used in towing their vessels in from sea with fares of fish and taking them out again.

The New England Ship Building Co., Bath, Me., received a contract this week to build a three-masted barkentine for the coastwise trade. This is the first contract for a barkentine to be let in Bath for fourteen years.

At a meeting of the sinking fund commission of New York last week \$14,400,000 was appropriated for dock improvements for the Staten Island ferry terminals and the new vessels for the improved service.

Mr. E. J. Shroeder, Jersey City, N. J., has placed an order with the Gas Engine & Power Co., Morris Heights, for a new motor boat is to be 45 ft. over all and to be equipped with a speedway six-cylinder motor of 60 H. P.

The coast survey steamer Arago, built for the service by the Williamette Iron & Steel Works, Portland, Ore., will be ready to go into commission in a short time. The vessel measures 86 ft. long, 18 ft. beam and 8 ft. 6 in. deep.

George Lawley & Son Corporation, South Boston, Mass., are to build a steel schooner yacht for Mr. Roy A. Rainey of Boston, from designs by A. S. Chesbrough. The yacht is to be 134 ft. over all, 95 ft. water line and 26 ft. beam.

It is reported that the Eastern Steamship Co. has decided to give contract to the Eastern Ship Building Co., New Lon-

don, Conn., for the construction of two turbine steamers. The steamers will be about 300 ft. long and will cost \$500,000.

Edward Croker, chief of the fire department of New York, appeared before the board of estimate of New York last week to ask for an appropriation of \$375,000 for three new fire boats. It is understood that the appropriation will be authorized.

The vessel in which Com'dr Peary is to make another attempt to reach the North pole will be launched from the yard of McKay & Dix on March 23, and will then be towed to the plant of the Portland Co., Portland, Me., to receive her engines.

The turbine steamer Victorian of the Allan Line underwent her trial trip on the Clyde last week and attained a speed of 19½ knots. Mr. Dunlop, chairman of the Allan Company, says that all doubts as to the efficiency of the turbine steamer have now been removed.

Henry B. Herbert, president of the Produce Exchange in New York, has been selected by the board of managers of the exchange to appear before the sinking fund commission and urge the purchase by the city of the thirty-ninth ferry from the battery to South Brooklyn.

The National Motor Boat and Sportsmen's Show recently held at Madison square garden, New York, was a great success and it has been decided to continue the shows for four years more at least. Capt. J. A. H. Dressel has been appointed general manager for four years.

Schuyler, Payne & Caddell, Redhook, N. Y., are building a steam lighter for Capt. G. Albin. The lighter is to be 70 ft. long, 18 ft. beam and 8 ft. deep, the frame of oak to be planked with yellow pine. The Kingsford Foundry & Machine Works, Oswego, N. Y., will supply the boilers.

The steamer Burton was recently launched from the yard of Crawford & Reid, Tacoma, Wash. She is 102 ft. long and 18 ft. beam. Her engines are of the compound type with cylinder diameters 10 and 22 in. by 14 in. stroke. Steam will be supplied by a Taylor water tube boiler.

Com'dr Perry's arctic ship, building by McKay & Dix, Bucksport, Me., is having some rudder pintles cast at the Bath Iron Works, Bath, Me. These pintles are to slide into a T-slot in the stern post to make it possible to haul the rudder out of danger if the ship gets caught in the ice.

The latest experiments with the French cruiser Depetit Thouars illustrated further the economy arising from the installation of Belleville boilers in this vessel. The consumption of coal per horse power per hour was only 559 grammes as against from 750 to 800 under previous conditions.

The sloop yacht Sonya, which is the only American designed boat to compete in foreign races of the 52-ft. class during the coming season, was launched at the Herreshoff yard, Bristol, R. I., last week. She is the property of Mrs. G. Turner Farley of London, and will be named by Capt. Fred Stokes.

The ship yards on the Pacific coast are quite busy on repair work. Bids were recently opened at San Francisco for remodeling the transport Dix. The bidders were: The Risdon Iron Works, \$10,000; Union Iron Works, \$10,930; W. A. Boole & Son, \$11,600; Fulton Iron Works, \$14,727; United Engineering Works, \$17,000.

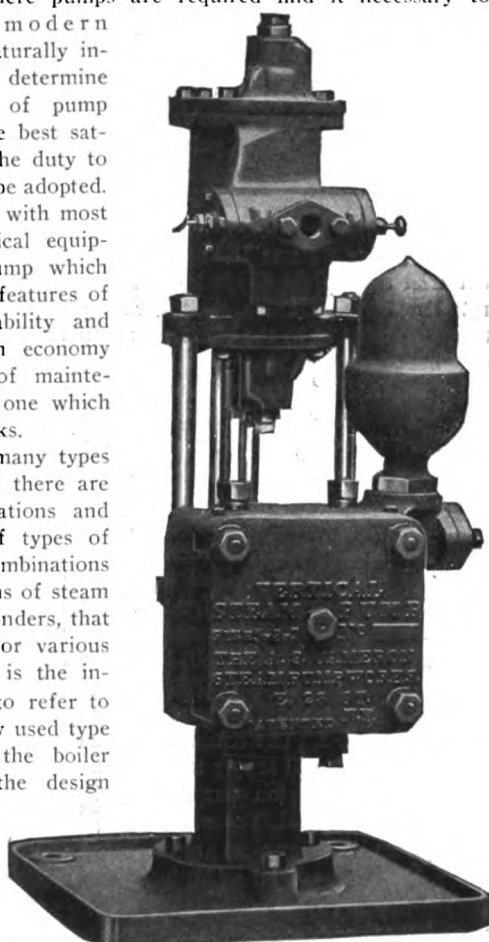
Mr. W. S. Howard, formerly head of the motor department of the Gas Engine & Power Co. and Charles L. Seabury & Co., Con., Morris Heights, New York, has organized a company known as the Ardsley Motor Car Co., Yonkers, N. Y., builders of the Ardsley car. He also intends to manufacture marine motors under his own name.

About forty owners of power boats at Oshkosh, Wis., have organized the Oshkosh Power Boat Club. The officers are: Commodore, J. A. Sargent; vice commodore, Wm. M. Habig; fleet captain, Wm. Carr; secretary, J. George Mueller; official measurer, Walter Radford; members of the advisory board, S. Hawthorne, E. Leach and W. H. Petrie.

CAMERON VERTICAL BOILER FEED PUMP

When men who manage manufacturing or other industrial enterprises where pumps are required find it necessary to purchase a modern pump, they naturally investigate to determine which make of pump will afford the best satisfaction for the duty to which it is to be adopted. In general, as with most other mechanical equipments, the pump which combines the features of security, durability and efficiency with economy in the cost of maintenance, is the one which the buyer seeks.

There are many types of pumps and there are many combinations and adaptations of types of pumps, and combinations and adaptations of steam and water cylinders, that are possible for various uses. But it is the intention here to refer to that commonly used type of machine, the boiler feed pump, the design and construction of which do so much, when the pump is a successful one, to add



CAMERON VERTICAL BOILER FEED PUMP.

to the efficiency and satisfactory results obtained from its use.

Men who have technical and engineering knowledge of modern pumps are well aware that the product of the A. S. Cameron Steam Pump Works is renowned for meeting all the conditions for which they are designed and proportioned, and there is scarcely any part of the world that could be mentioned, where Cameron pumps are not in satisfactory use. They are sent to districts so remote from the ordinary transportation facilities, in the farthest corners of the world, that the most primitive means of mule back carriage are resorted to in conveying the various parts of their sectionalized pumps to their destination, where they are then set up.

For boiler feeding the company lists among other types, the Cameron vertical boiler feed pump—an illustration of which is presented herewith. The photographic reproduction shows a plain unassuming vertical piston pump on base, but where it is known its virtues are appreciated, since it possesses every necessary attribute of a perfect direct-acting pump, occupying but little space and giving the maximum capacity. Although shown on a base plate, it is sometimes preferred for marine use to bolt the pump, by means of lugs cast on the back, to the bulkhead. This has been done in the case of pumps of this type furnished to the smaller gunboats and which have seen quite active service in the United States navy. In common with all Cameron pumps, no working part is exposed except a small part of the rod, which may also be covered, if necessary. The steam end may be adapted to work under any steam pressure, no matter how high, and the water end is fitted with Cameron patent priming valves, and a removable bushing or lining which may be taken out and replaced with a new one in a few minutes, thus

avoiding any delay when it becomes necessary to renew the working barrel of the cylinder on account of wear.

Pump users and buyers who are desirous of becoming further acquainted with the facts relating to this or any other type of pump made by the A. S. Cameron Steam Pump Works, are invited to address the main offices and plant at the foot of East Twenty-third street, New York city, and ask for the pamphlet which will be forwarded at once.

TRADE NOTES

The A. S. Cameron Steam Pump Works, New York, have just issued a very tasty little four-page folder descriptive of the Cameron single direct-acting pump.

The National Electric Co., Milwaukee, Wis., has just put out two attractive cards advertising the Lundell universal motors and the Christensen air brake equipments.

The Westinghouse Electric & Manufacturing Co., Pittsburg, Pa., has just put out a very attractive little booklet entitled "Wattmeters and How to Read Them." This little booklet is extremely valuable to consumers of electricity, because it tells them absolutely how to read the meter and therefore how to verify their accounts.

An automatic feed pump and receiver is described in Bulletin B 81, issued by the Geo. F. Blake Manufacturing Co. of 114 Liberty street, New York city. This apparatus is arranged to automatically pump water of condensation directly back to the boilers and is used for draining steam coils, radiators, heaters, drying cylinders, steam jackets, etc.

Spon & Chamberlain, 123-125 Liberty street, New York, have just published a time chart of the world, a novelty both valuable and ingenious. By setting the hour card for any time at any given place the time at all other places will at once be indicated. The contrivance is the patent of Dr. J. F. B. Cordeiro, of the United States navy. The list price is 25 cents.

There has recently been sent us a copy of "Protection, Resistance, Durability," a handsome and interesting booklet, describing the methods of manufacture in the electric furnace and use of Acheson graphite for paint pigment. Any one interested in protecting metal surfaces from corrosion and decay would do well to write for this booklet to the International Acheson Graphite Co., Niagara Falls, N. Y.

The H. W. Johns-Manville Co., 100 William street, New York, has just put out a little booklet concerning flange joint gaskets. The booklet says that the Kearsarge flange joint gasket is made from a superior quality of asbestos cloth with fine brass wire interwoven in the individual strands and that it is more efficient and durable than any gasket cut from a sheet and is cheaper and easier of application. The booklet will be sent to anyone upon request.

In the exhibit of the Electric Launch Co. at the motor boat show in New York, is shown one of the General Electric Co.'s mercury arc rectifiers in full operation. It is used to charge forty-four cells of battery in the electric launch Rest-Awhile, the current being 30 amperes at 110 volts, direct current; the alternating current used is 220 volts, 60 cycles. This presents an interesting field for the use of mercury arc rectifiers and it is probable that the use of electric launches may be materially increased because of the simplicity of the charging outfit now offered.

The Wellman-Seaver-Morgan Co., engineers and manufacturers of Cleveland, have just put out a catalogue concerning the Johnson patent arch plate to facilitate the work of repairing and rebuilding furnace door arches. The arch plate fits on the ram of the charging machine and can be quickly picked up by it or detached as desired. The furnace door is raised out of the way and the charging machine inserts the plate in charging opening of furnace, holding it there in proper position until the repairs are completed when it is withdrawn and detached from the ram of the charging machine.



VOL. XXXI.

CLEVELAND, O., MARCH 23, 1905.

No. 12.

Ship Loading and



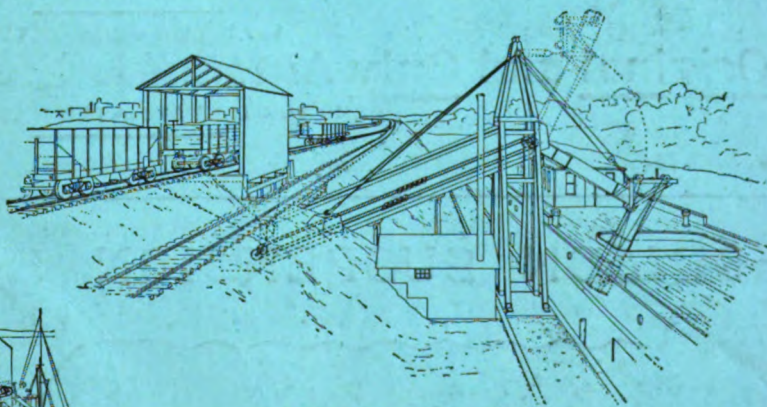
PACIFIC COAST CO., SEATTLE, WASH.
Ship Loading Plant, Loading Capacity 1400 Tons of Coal per Hour

Fueling Plants

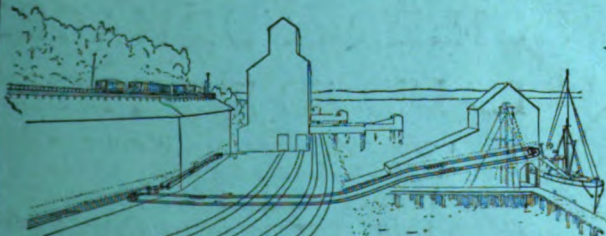
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We also Design and Install
Machinery of the highest efficiency for
Handling Miscellaneous Freight
in Steamship Docks and Warehouses



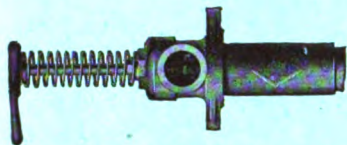
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Ship Loading Plant, Loading 700 Tons of Mine
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NORTHERN PACIFIC RY. CO., TACOMA, WASH.
Loading 700 Tons per Hour

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The Link-Belt Machinery Co.
Engineers, Founders, Machinists. **CHICAGO**

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The Diamond Blower.

This machine will be sent on trial to any responsible house with the full privilege of retaining or returning same. It will be to your interest to investigate.

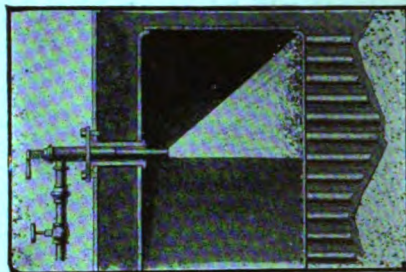
Canadian Office,
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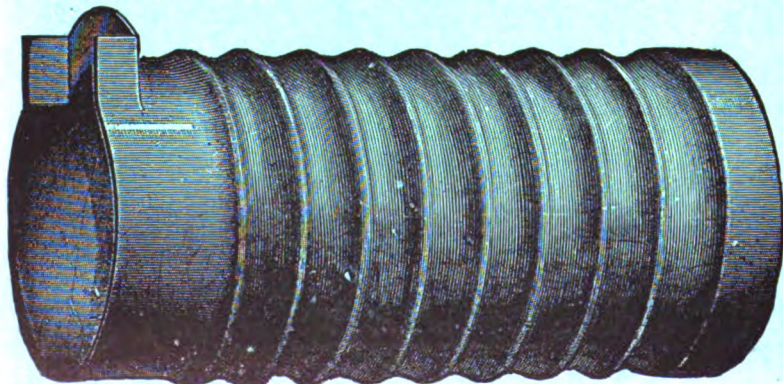
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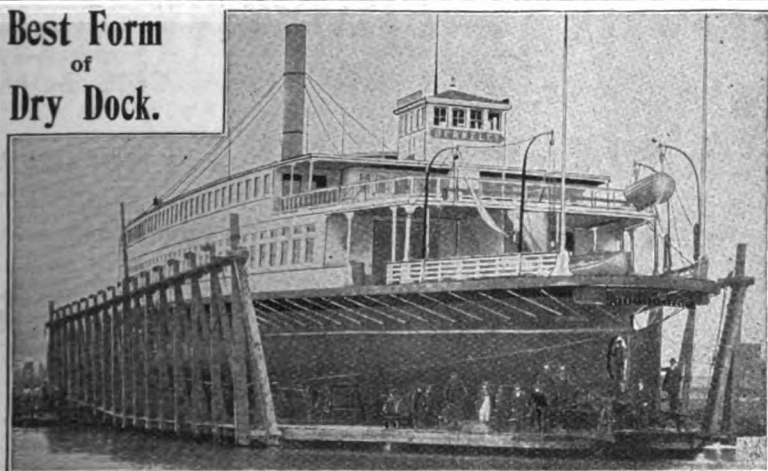
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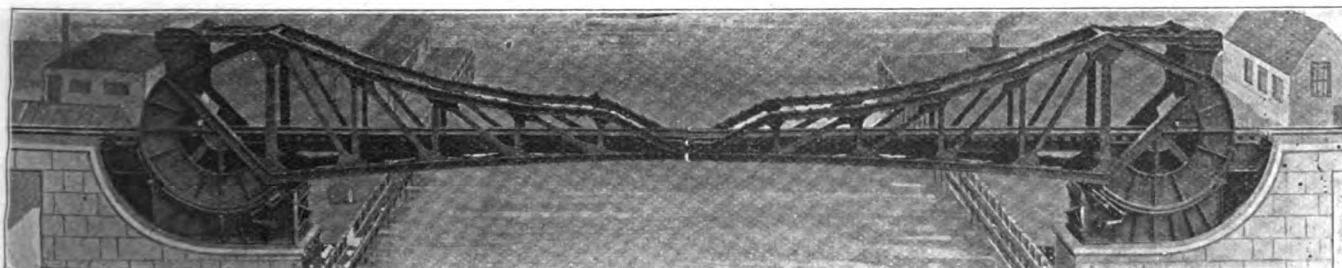
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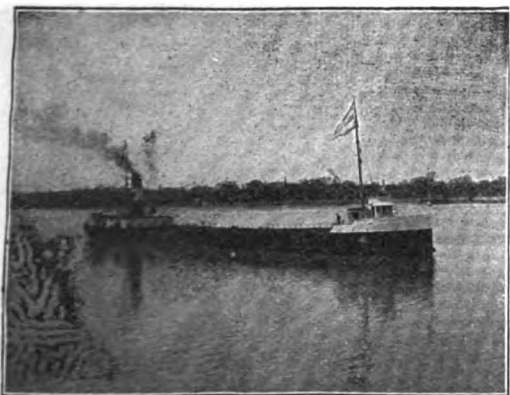


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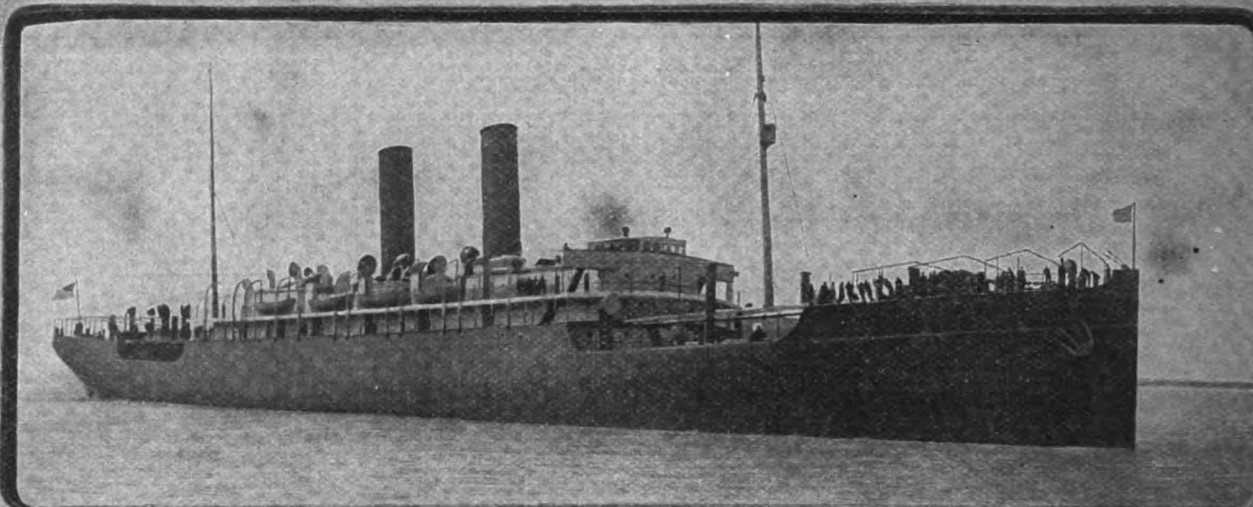
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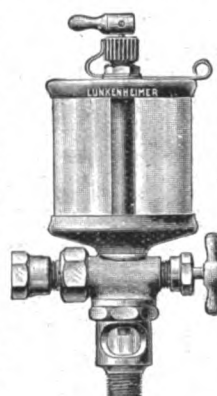
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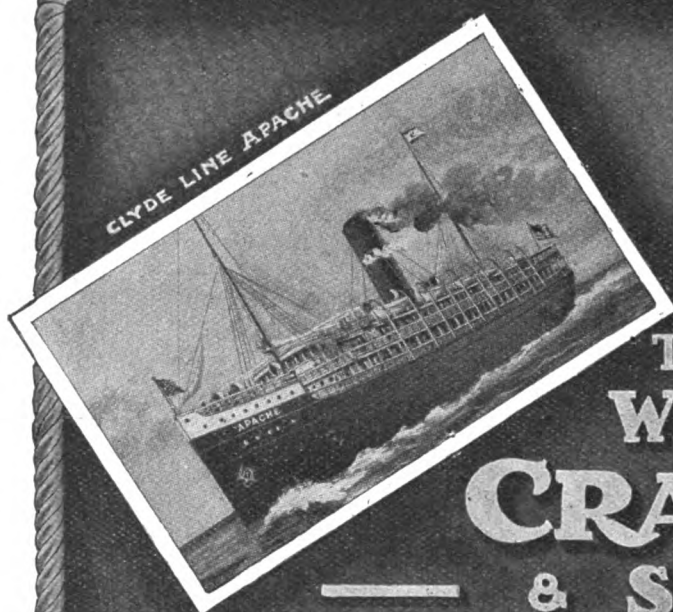
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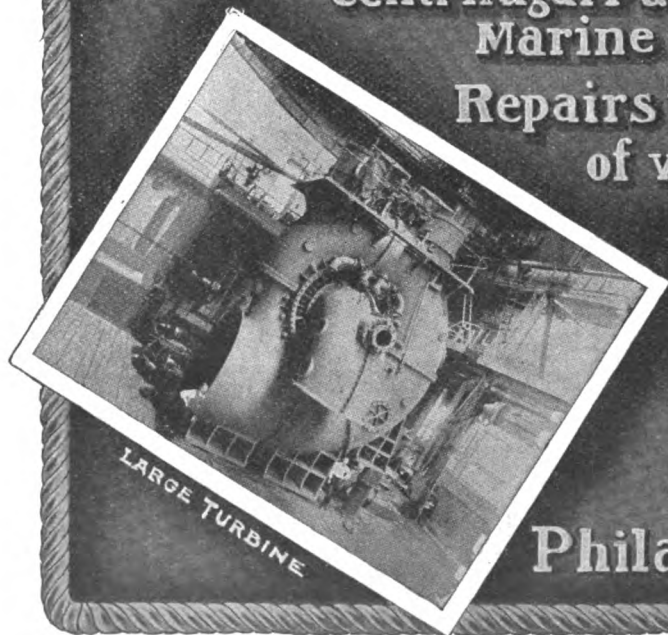
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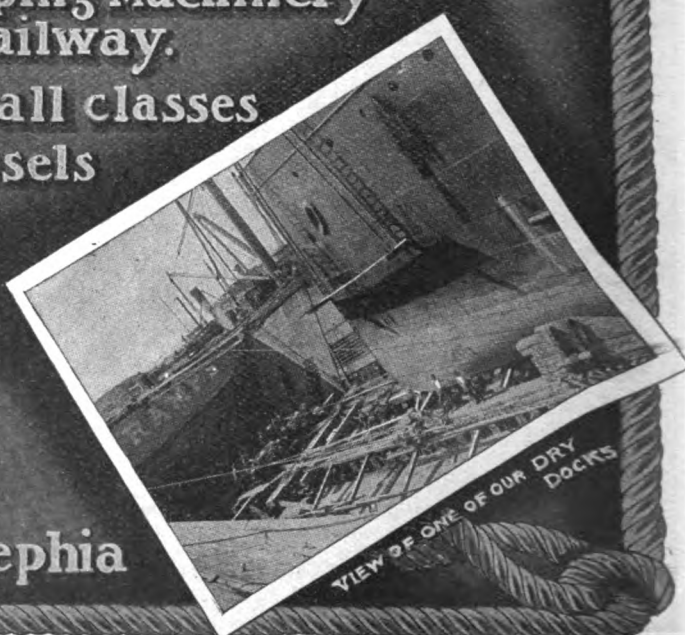
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THE BEST GRADE OF

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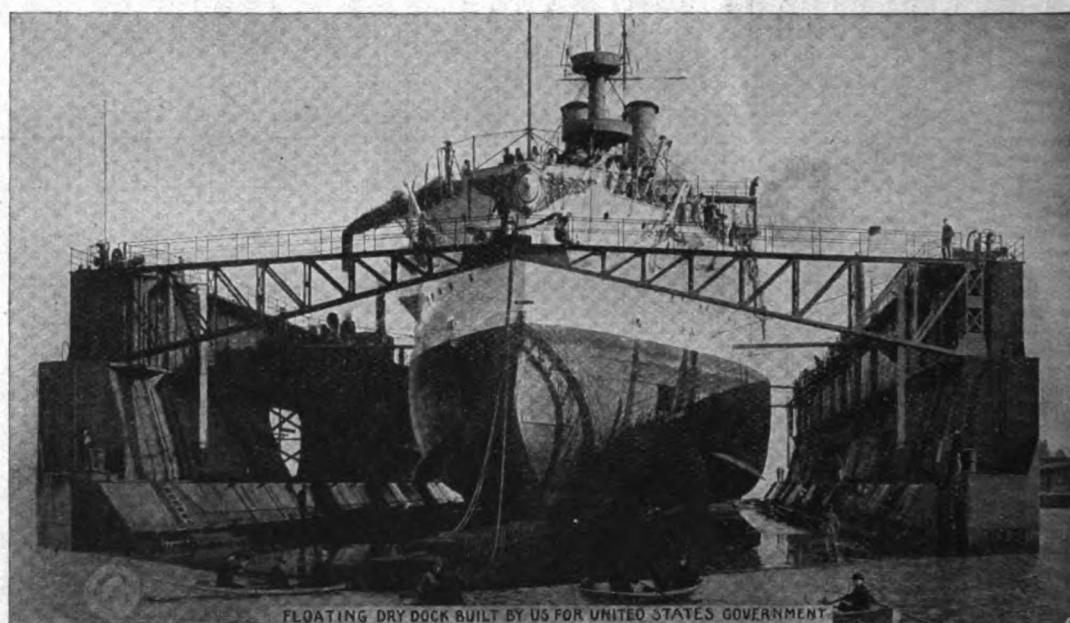
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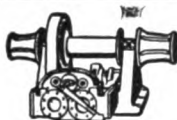
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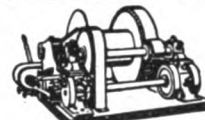
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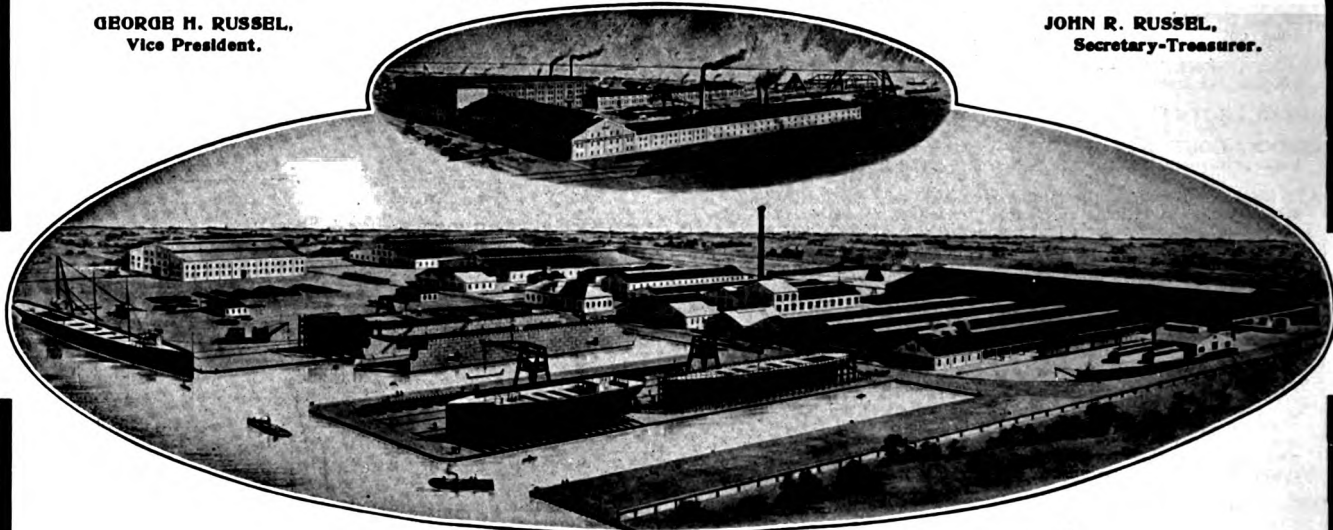
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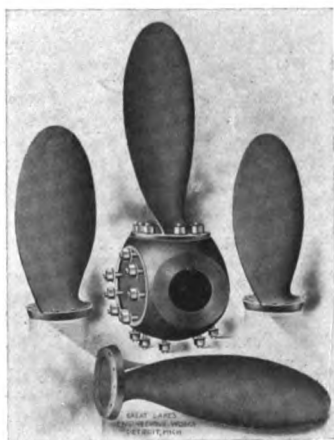
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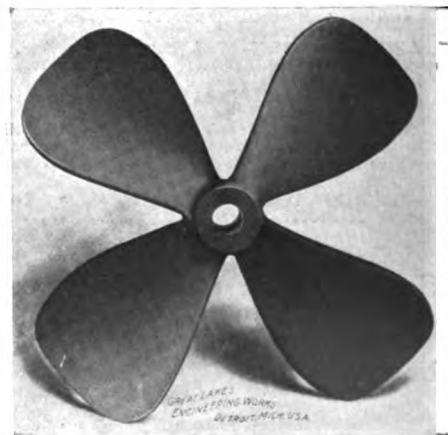


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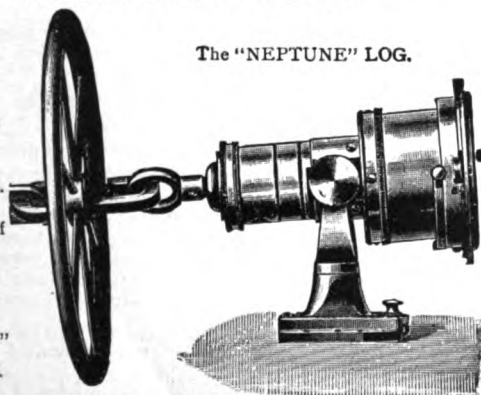
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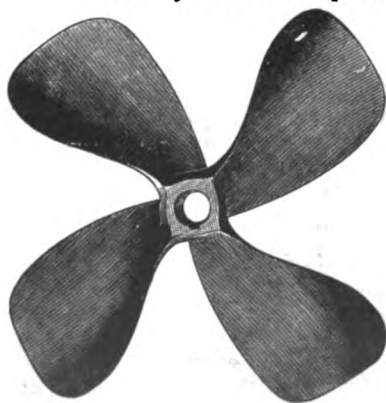
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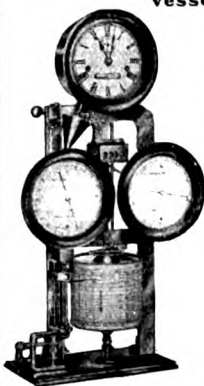
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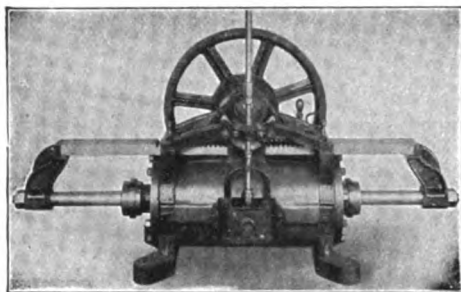
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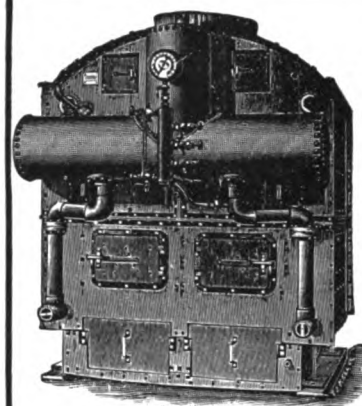
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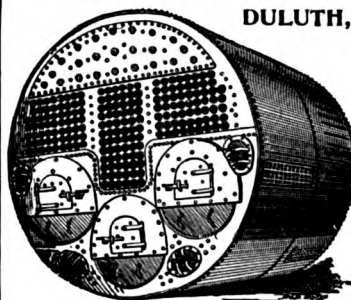
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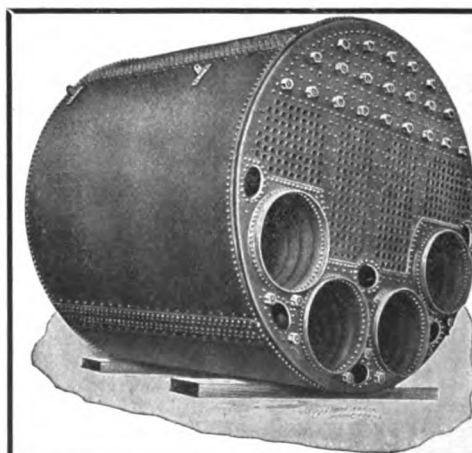
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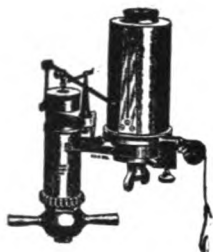


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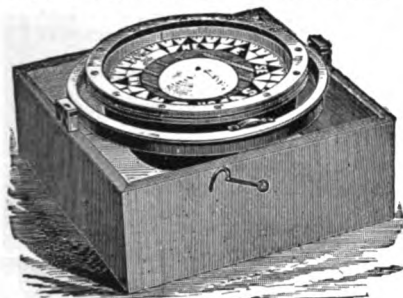
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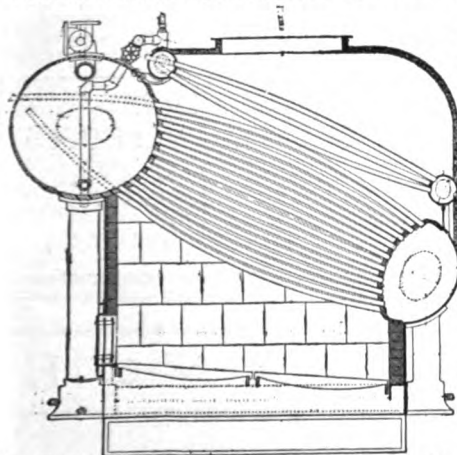
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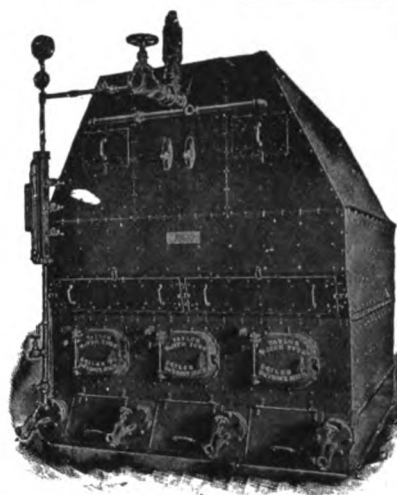


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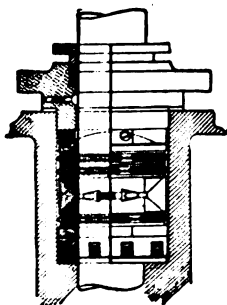
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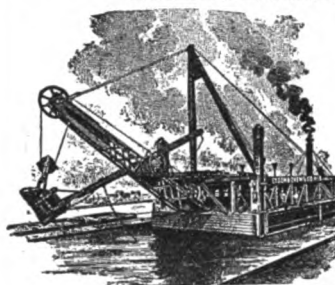
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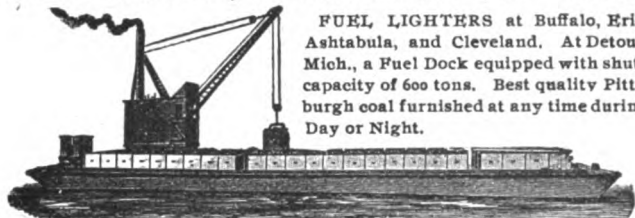
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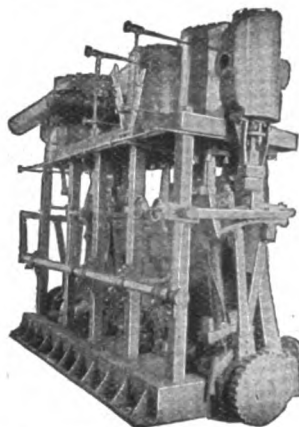
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For a more complete classification than that represented by advertisers in the Marine Review, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by The Marine Review, Cleveland.

See accompanying index of Advertisers for full addresses of concerns in this directory.

AIR COMPRESSORS, AIR HOISTS, ETC.
Great Lakes Engineering Works.....Detroit.
Mietz, Aug. New York.

AIR PORTS, DEAD LIGHTS, ETC.
Marine Mfg. & Supply Co.....New York.

AIR PUMPS AND APPLIANCES.
Fore River Ship & Engine Co., Quincy, Mass.
Great Lakes Engineering Works.....Detroit.

ANCHORS.
Bowers, L. M. & Co.....Binghamton, N. Y.
Seaboard Steel Casting Co.....Chester, Pa.

ANTI-FOULING AND ANTI-CORROSIVE COMPOSITION FOR STEEL VESSELS.
Holzapfel's American Composition Co., New York.

ANTI-FRICTION METALS.
Cramp, Wm. & Sons.....Philadelphia.

ARTIFICIAL DRAFT FOR BOILERS.
American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Sturtevant, B. F., Co.....Hyde Park, Mass.

ASH EJECTORS.
Great Lakes Engineering Works.....Detroit.

ATTORNEYS AND PROCTORS IN ADMIRALTY.

Gilchrist, Albert J.....Cleveland.
Goulder, Holding & Masten.....Cleveland.
Hoyt, Dustin & Kelley.....Cleveland.
Kremer, C. E.....Chicago.
MacDonald, Ray G.....Chicago.
Potter & Potter.....Buffalo.
Shaw, Warren, Cady & Oakes.....Detroit.
White, Johnson, McCaslin & Cannon Cleveland.

BAROMETERS, MARINE GLASSES, ETC.
Ritchie, E. S. & Sons.....Brookline, Mass.

BELTING, RUBBER.
New York Belting & Packing Co....New York.

BLOCKS, SHEAVES, ETC.
Boston & Lockport Block Co....Boston, Mass.
Cleveland Block Co.....Cleveland.

BLOWERS.
Power Specialty Co.....Detroit.
Sturtevant, B. F. Co.....Hyde Park, Mass.

BOAT BUILDERS.
Drem, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, David.....New York.
Lane & DeGroot Long Island City, N. Y.
Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co....St. Joseph, Mich.
Willard, Chas. P. & Co. Winthrop Harbor, Ill.

BOILER CLEANING DEVICE.
Power Specialty Co.....Detroit.

BOILER COMPOUNDS.
Dearborn Drug & Chemical Works....Chicago.

BOILER MANUFACTURERS.
Almy Water Tube Boiler Co., Providence, R. I.
American Ship Building Co.....Cleveland.
Atlantic Works East Boston, Mass.
Babcock & Wilcox Co.....New York.
Bertram Engine Works Co., Ltd.
.....Toronto, Can.
Chicago Ship Building Co.....Chicago.
Cramp, Wm. & Sons.....Philadelphia.
Dearing Water Tube Boiler Co.....Detroit.
DeLauney, Belleville & Co. St. Denis, France.
Detroit Ship Building Co.....Detroit.
Fletcher, W. A. & Co.....Hoboken, N. J.
Fore River Shipbuilding Co.....Quincy, Mass.
Georgian Bay Engineering Works.....
.....Midland, Ont.
Great Lakes Engineering Works.....Detroit.

BOILER MANUFACTURERS—Continued.
Kingsford Foundry & Machine Works....
.....Oswego, N. Y.
Marine Iron Works Chicago.
Maryland Steel Co.....Sparrows Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher Water Tube Boiler Co.....New York.
Newport News Ship Building Co.....
.....Newport News, Va.
New York Shipbuilding Co.....Camden, N. J.
Northwestern Steam Boiler & Mfg. Co.....
.....Duluth, Minn.
Roberts Safety Water Tube Boiler Co.....
.....New York.
Stirling, The Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.
Willard, Chas. P. & Co., Winthrop Harbor, Ill.

BOILER RIVETS.
Bourne-Fuller Co.....Cleveland.

BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.
Falls Hollow Staybolt Co., Cuyahoga Falls, O.

BOILER TUBES, MARINE.
Reading Iron Co.....Reading, Pa.

BRASS AND BRONZE CASTINGS.
Cramp, Wm. & Sons.....Philadelphia.
Fore River Ship & Engine Co., Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Lunkenheimer Co.....Cincinnati.
Macbeth Iron Co.....Cleveland.

BRIDGES, BUILDERS OF.
Cowing, John P.....Cleveland.
Scherzer Rolling Lift Bridge Co.....Chicago.

BUCKETS, ORE AND COAL.
Brown Hoisting & Conveying Machine Co.
.....Cleveland.
McMyler Mfg. Co.....Cleveland.

BULKHEAD DOORS, WATERTIGHT.
"Long Arm" System Co. Cleveland

CABIN AND CABINET FINISHING WOODS.

Martin-Barriss Co.....Cleveland.

CANVAS SPECIALTIES.
Baker & Co., H. H.....Buffalo.
Upson-Walton Co.....Cleveland.

CAPSTANS.
American Ship Windlass Co., Providence, R. I.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.

CARPETS, RUGS AND FURNITURE.
Williams & Rodgers Co.....Cleveland.

CEMENT, IRON FOR REPAIRING LEAKS.
Smooth-On Mfg. Co.....Jersey City, N. J.

CHAINS.
Woodhouse Chain Works.....Trenton, N. J.

CHAIN CONVEYORS, HOISTS.
Brown Hoisting Machinery Co. (Inc.)....
.....Cleveland.
General Electric Co.....Schenectady, N. Y.

CHAIN HOISTS.
Boston & Lockport Block Co....Boston, Mass.

CHARTS.
Penton Publishing Co.....Cleveland.
Potter, J. D.....London.

CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.
Ashton Valve Co.....Boston.
Ritchie, E. S. & Sons.....Brookline, Mass.

COAL PRODUCERS AND SHIPPERS.
Hanna, M. A. & Co.....Cleveland.
Ironville Dock & Coal Co.....Toledo, O.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.

COAL AND ORE HANDLING MACHINERY.
Brown Hoisting Machinery Co. (Inc.) ..
.....Cleveland.
McMyler Mfg. Co.....Cleveland.

COMPASSES.
Ritchie, E. S. & Sons.....Brookline, Mass.

CONDENSORS.
Great Lakes Engineering Works... Detroit.
Thropp & Sons Co., John E....Trenton, N. J.

CONTRACTORS SUPPLIES.
Contractors Supply & Equipment Co., Chicago.

CONTRACTORS FOR PUBLIC WORKS.
Breyman & Bros., G. H.....Toledo.
Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co.
.....Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Hickler Bros. Sault Ste. Marie, Mich.
Lake Superior Contracting & Dredging Co.
.....Duluth, Minn.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H. Milwaukee.
Sullivan, M. Detroit.

CORDAGE.
Baker & Co., H. H.....Buffalo.
Upson-Walton Co.....Cleveland.

CORK JACKETS AND RINGS.
Armstrong Cork Co.....Pittsburg, Pa.
Kahnweiler's Sons, D.....New York.

CRANES, TRAVELING.
Brown Hoisting Machinery Co.....Cleveland.
McMyler Mfg Co.....Cleveland.

DIVING APPARATUS.
Morse, A. J. & Son.....Boston.
Schrader's Son, A.....New York.

DREDGING CONTRACTORS.
Breyman & Bros., G. H.....Toledo.
Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co.
.....Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Hickler Bros. Sault Ste. Marie, Mich.
Lake Superior Contracting & Dredging Co.
.....Duluth, Minn.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H. Milwaukee.
Sullivan, M. Detroit.

DRYING APPARATUS.
Sturtevant, B. F., Co.....Hyde Park, Mass

DRY DOCKS.
American Ship Building Co.....Cleveland.
Atlantic Works East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Chicago Ship Building Co.....Chicago.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.....
.....Newport News, Va.
Shipowners Dry Dock Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.

Buyers' Directory of the Marine Trade.—Continued.

ELECTRIC HOISTS AND CRANES.

General Electric Co.....Schenectady, N. Y.

ELECTRIC LIGHT AND POWER PLANTS.General Electric Co.....Schenectady, N. Y.
Mietz, Aug. New York.
Sturtevant, B. F. Co.....Hyde Park, Mass.
Thropp & Sons, John E.....Trenton, N. J.**ENGINE BUILDERS, MARINE.**American Ship Building Co.....Cleveland.
Atlantic Works East Boston, Mass.
Bertram Engine Works Co., Ltd. Toronto, Can.
Chicago Ship Building Co.....Chicago.
Chase Machine Co.....Cleveland.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Dake Engine Co.....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works Detroit, Mich.
Hall Bros. Philadelphia.
Lockwood Mfg. Co.....East Boston, Mass.
Marine Iron Works Chicago.
Maryland Steel Co.....Sparrows Point, Md.
Mietz, Aug. New York.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher, Chas. D.....New York.
Moulton Steering Engine Co.....New York.
Newport News Ship Building Co.....Newport News, Va.
New York Shipbuilding Co.....Camden, N. J.
Northwestern Steam Boiler & Mfg. Co.....Duluth, Minn.
Roach's Ship Yard Chester, Pa.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co.....Superior, Wis.
Thropp, J. E. & Sons Co.....Trenton, N. J.
Trout, H. G.....Buffalo.
Willard, Chas. P. & Co.....Winthrop Harbor, Ill.**ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.**Cory, Chas. & Son.....New York.
Marine Mfg. Supply Co.....New York.**ENGINE TESTING.**

Kreer & Parsons.....Chicago.

ENGINEERING SPECIALTIES AND SUPPLIES.Crane Co.....Chicago.
Kieley & Mueller.....New York.
Lunkenheimer Co.....Cincinnati.
New York Belting & Packing Co.....New York.
Northwestern Steam Boiler & Mfg. Co.....Duluth, Minn.**ENGINEERS, MARINE, MECHANICAL, CONSULTING.**Hynd, Alexander Cleveland.
Hunt, Robt. W. & Co.....Chicago.
Kidd, Joseph Duluth, Minn.
Kreer & Parsons.....Chicago.
Lovejjoy, H. O.....Buffalo.
Matteson & Drake Philadelphia.
Mosher, Chas. D.....New York.
Nacey, James Cleveland.
Rice, Henry Buffalo.
Roelker, H. B.....New York.
Wood, W. J. Chicago.**FANS FOR VENTILATION, EXHAUST, ETC.**

Sturtevant, B. F. Co.....Hyde Park, Mass.

FEED WATER PURIFIERS AND HEATERS.Reilly Repair and Supply Co., Jas.....New York.
Ross Valve Co.....Troy, N. Y.**FIXTURES FOR LAMPS, OIL OR ELECTRIC.**

General Electric Co.....Schenectady, N. Y.

FORGES.

Sturtevant, B. F. Co.....Boston.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.Cleveland City Forge & Iron Co.....Cleveland.
Fore River Shipbuilding Co.....Quincy, Mass.
Macbeth Iron Co.....Cleveland.**FLUE WELDING.**

Fix's, S. Sons Cleveland.

FUEL ECONOMIZERS.

Sturtevant Co., B. F.....Hyde Park, Mass.

FUELING COMPANIES AND COAL DEALERS.Hanna, M. A. & Co.....Cleveland.
Ironville Dock & Coal Co.....Toledo, O.
Parker Bros. Co., Ltd.....Detroit.
Picklands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Smith, Stanley B., & Co.....Detroit.
Smith Coal & Dock Co., Stanley B.....Toledo, O.**FURNACES FOR BOILERS.**

Continental Iron Works.....New York.

GASKETS, RUBBER.

New York Belting & Packing Co.....New York.

GAS BUOYS.

Safety Car Heating & Lighting Co.....New York.

GAS AND GASOLINE ENGINES.Chase Machine Co.....Cleveland.
Georgian Bay Engineering Works.....Midland, Ont.
Reliance Mfg. Co.....Providence, R. I.**GAUGES, STEAM AND VACUUM.**American Steam Gauge & Valve Mfg. Co.....Boston.
Ashton Valve Co.....Boston.
Lunkenheimer Co.....Cincinnati.**GAUGES, WATER.**Bonner & Co., Wm. T.....Boston.
Lunkenheimer Co.....Cincinnati, O.**GRAPHITE.**

Dixon Crucible Co., Joseph.....Jersey City, N. J.

HAMMERS, STEAM.

Chase Machine Co.....Cleveland.

HEATING APPARATUS.

Sturtevant, B. F. Co.....Hyde Park, Mass.

HOISTS FOR CARGO, ETC.American Ship Building Co.....Cleveland.
Brown Hoisting Machinery Co. (Inc.).....Cleveland.
Chase Machine Co.....Cleveland.
General Electric Co.....New York.
Georgian Bay Engineering Works.....Midland, Ont.
Hyde Windlass Co.....Bath, Me.
McMyler Mfg. Co.....Cleveland.
Marine Iron Co.....Bay City.
Mietz, Aug. New York.**HOLLOW STAYBOLT IRON.**

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

HOSE, RUBBER.

New York Belting & Packing Co.....New York.

HYDRAULIC DREDGES.

Great Lakes Engineering Works.....Detroit.

HYDRAULIC TOOLS.

Watson-Stillman Co., The.....New York.

ICE MACHINERY.Great Lakes Engineering Works.....Detroit.
Roelker, H. B.....New York.**INDICATORS FOR STEAM ENGINES.**American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.**INJECTORS.**American Injector Co.....Detroit.
Crane Co.....Chicago.
Jenkins Bros. New York.
Lunkenheimer Co.....Cincinnati.
Penberthy Injector Co.....Detroit, Mich.**INSURANCE, MARINE.**Elphicke, C. W. & Co.....Chicago.
Fleming & Co., E. J.....Chicago.**INSURANCE, MARINE—Continued.**Gilchrist & Co., C. P.....Cleveland.
Hawgood & Co., W. A.....Cleveland.
Helm & Co., D. T.....Duluth.
Hutchinson & Co.....Cleveland.
McCarthy, T. R.....Montreal.
McCurdy, Geo. L.....Chicago.
Mitchell & Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Peck, Chas. E. & W. F.....New York & Chicago.
Prindiville & Co.....Chicago.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.**IRON CASTINGS.**

Reading Iron Co.....Reading, Pa.

IRON ORE AND PIG IRON.Bourne-Fuller Co.....Cleveland, O.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.
Reading Iron Co.....Reading, Pa.**LAUNCHES—STEAM, NAPHTHA, ELECTRIC.**Georgian Bay Engineering Works.....Midland, Ont.
Marine Iron Works.....Chicago.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Willard, Chas. P.....Winthrop Harbor, Ill.**LIFE PRESERVERS, LIFE BOATS, BUOYS.**Armstrong, Cork Co.....Pittsburg.
Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, D. New York.**LIGHTS, SIDE AND SIGNAL.**

Russell & Watson Buffalo.

LOGS.Nicholson Ship Log Co.....Cleveland.
Walker & Sons, Thomas Birmingham, Eng.
Also Ship Chandlers.**LUBRICATING GRAPHITE.**

Dixon Crucible Co., Joseph.....Jersey City, N. J.

LUBRICATORS.Crane Co.....Chicago.
Lunkenheimer Co.....Cincinnati.**LUMBER.**

Martin-Barriss Co.....Cleveland.

MACHINISTS.Chase Machine Co.....Cleveland.
Hickler Bros. Sault Ste. Marie, Mich.
Lockwood Mfg. Co.....East Boston, Mass.**MACHINE TOOLS (WOOD WORKING).**

Atlantic Works, Inc.....Philadelphia.

MARINE RAILWAYS.

Hickler Bros. Sault Ste. Marie, Mich.

MARINE RAILWAYS, BUILDERS OF.

Crandall & Son, H. I....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.....New York.

MECHANICAL DRAFT FOR BOILERS.American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works Detroit.
Sturtevant, B. F. Co.....Hyde Park, Mass.**METALLIC PACKING.**

Katzenstein, L. & Co.....New York.

METAL POLISH.

Bertram's Oil Polish Co.....Boston.

MOTORS, GENERATORS—ELECTRIC.Fisher Electrical Works.....Detroit.
General Electric Co.....Schenectady, N. Y.
Sturtevant, B. F. Co.....Hyde Park, Mass.

Buyers' Directory of the Marine Trade.—Continued.

NAUTICAL INSTRUMENTS.

Ritchie, E. S., & Sons.....Brookline, Mass.

NAVAL ARCHITECTS.

Hynd, Alexander Cleveland.
 Kidd, Joseph.....Duluth, Minn.
 Kreer & Parsons.....Chicago.
 Lovejoy, H. O.....Buffalo.
 Matteson & Drake.....Philadelphia.
 Mosher, Chas. D.....New York.
 Nacey, James.....Cleveland.
 Rice, Henry.....Buffalo.
 Wood, W. J.....Chicago.

OAKUM.

Stratford, Oakum Co.....Jersey City, N. J.

OIL ENGINES.

Mietz, Aug. New York.

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph.....Jersey City, N. J.
 Standard Oil Co.....Cleveland.

PACKING.

Crane Co. Chicago.
 Jenkins Bros. New York.
 Katzenstein, L. & Co.....New York.
 New York Belting & Packing Co.....New York.

PACKING TOOL.

Matteson & Drake Philadelphia.

PAINTS.

Baker, Howard H. & Co.....Buffalo.
 Carbolineum Wood Preserving Co.....Milwaukee.
 New Jersey Zinc Co.....New York.
 Upson-Walton Co. Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc.....Philadelphia.

PILE DRIVING AND SUBMARINE WORK.

Buffalo Dredging Co.....Buffalo.
 Chicago & Gt. Lakes Dredge & Dock Co.....Chicago.
 Dunbar & Sullivan Dredging Co.....Chicago.
 Fitz-Simons & Connell Co.....Chicago.
 Hickler Bros. Sault Ste. Marie, Mich.
 Lake Superior Contracting & Dredging Co.....Duluth, Minn.
 Parker Bros. Co., Ltd.....Detroit.
 Smith Co., L. P. & J. A.....Cleveland.
 Starke Dredge & Dock Co., C. H.....Milwaukee.
 Sullivan, M. Detroit.

PIPE, WROUGHT IRON.

Bourne-Fuller Co.....Cleveland, O.
 Crane Co. Chicago.
 Macbeth Iron Co.....Cleveland.
 Reading Iron Co.....Reading, Pa.

PLANING MILL MACHINERY.

Atlantic Works, Inc.....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co.....Cleveland, O.
 Otis Steel Co.....Cleveland.
 Reading Iron Co.....Reading, Pa.

PRESSURE REGULATORS.

Kieley & Mueller New York.
 Ross Valve Co.....Troy, N. Y.

PROPELLER WHEELS.

American Ship Building Co.....Cleveland.
 Atlantic Works East Boston, Mass.
 Cramp, Wm. & Sons.....Philadelphia.
 Detroit Ship Building Co.....Detroit.
 Fore River Shipbuilding Co.....Quincy, Mass.
 Great Lakes Engineering Works.....Detroit.
 Hyde Windlass Co.....Bath, Me.
 Lockwood Mfg. Co.....East Boston, Mass.
 Marine Iron Works.....Chicago.
 Milwaukee Dry Dock Co.....Milwaukee.
 Newport News Ship Building Co.....Newport News, Va.
 Roelker, H. B.....Newport News, Va.
 Sheriffs Mfg. Co.....Milwaukee.
 Superior Ship Building Co.....Superior, Wis.
 Thropp & Sons Co., J. E.....Trenton, N. J.
 Trout, H. G.....Buffalo.

PROJECTORS, ELECTRIC.

General Electric Co.....Schenectady, N. Y.

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F., Mfg. Co.....New York.
 Great Lakes Engineering Works.....Detroit.
 Marine Iron Works.....Chicago.
 Kingsford Foundry & Machine Works.....Oswego, N. Y.

REFRIGERATING APPARATUS.

Great Lakes Engineering Works.....Detroit.
 Koelker, H. B.....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register Cleveland.
 Record of American & Foreign Shipping.....New York.

REPAIRS—ENGINE AND BOILER.

(See also Boiler Manufacturers and Engine Builders.)

Georgian Bay Engineering Works.....Midland, Ont.

RIVETS, STEEL FOR SHIPS AND BOILERS.

Bourne-Fuller Co.....Cleveland, O.

SAFETY VALVES.

American Steam Gauge & Valve Mfg. Co.....Boston.
 Ashton Valve Co.....Boston.
 Crane Co.....Chicago.
 Lunkenheimer Co. Cincinnati.

SAIL MAKERS.

American Canvas & Tarpaulin Corp Buffalo.
 Baker, Howard H. & Co.....Buffalo.
 Upson-Walton Co.....Cleveland.

SALVAGE COMPANIES.

See Wrecking Companies.

SEARCH LIGHTS.

General Electric Co.....Schenectady, N. Y.

SEARNS.

See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co.....Cleveland, O.
 Otis Steel Co.....Cleveland.
 Reading Iron Co.....Reading, Pa.

SHIP BUILDERS.

American Ship Building Co.....Cleveland.
 Atlantic Works East Boston, Mass.
 Bertram Engine Works Co., Ltd.....Toronto, Can.
 Buffalo Dry Dock Co.....Buffalo.
 Cramp, Wm. & Sons.....Philadelphia.
 Craig Ship Building Co.....Toledo, O.
 Chicago Ship Building Co.....Chicago.
 Detroit Ship Building Co.....Detroit.
 Fore River Shipbuilding Co.....Quincy, Mass.
 Great Lakes Engineering Works.....Detroit.
 Lockwood Mfg. Co.....East Boston, Mass.
 Maryland Steel Co.....Sparrows Point, Md.
 Milwaukee Dry Dock Co.....Milwaukee.
 Newport News Ship Building Co.....Newport News, Va.
 New York Shipbuilding Co.....Camden, N. J.
 Roach's Ship Yard Chester, Pa.
 Shipowner's Dry Dock Co.....Chicago.
 Smith & Son, Abram.....Algonac, Mich.
 Willard, Chas. P. & Co.....Winthrop Harbor, Ill.

SHIP CHANDLERS.

American Canvas & Tarpaulin Corp Buffalo.
 Baker, Howard H. & Co.....Buffalo.
 Marine Mfg. & Supply Co.....New York.
 Upson-Walton Co.....Cleveland.

SHIP DESIGNERS.

Kidd, Joseph.....Duluth.
 Kreer & Parsons.....Chicago.
 Matteson & Drake.....Buffalo.
 Rice & Lovejoy.....Buffalo.
 Steel, Nacey & Hynd.....Cleveland.
 Wood, W. J.....Chicago.

SHIP LANTERNS AND LAMPS.

Russell & Watson Buffalo.

SHIP TIMBER.

Martin-Barriess Co.....Cleveland.

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co.....Jersey City, N. J.

STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co., Cuyahoga Falls, O.
 Reading Iron Co.....Reading, Pa.

STEAM VESSELS FOR SALE.

Gilchrist & Co., C. P.....Cleveland.
 Holmes, Samuel New York.
 Lester, S. S.....Quebec, Can.
 McCarthy, T. R.....Montreal, Can.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line New York.
 Anchor Line Buffalo.
 Boston Steamship Co.....Boston.
 International Mercantile Marine Co.....Philadelphia.
 New York & Cuba Mail S. S. Co.....New York.
 Red Star Line New York.
 United Fruit Co Boston.

STEEL CASTINGS.

Otis Steel Co.....Cleveland.

STEERING APPARATUS.

American Ship Building Co.....Cleveland.
 Chase Machine Co.....Cleveland.
 Detroit Ship Building Co.....Detroit.
 Hyde Windlass Co.....Bath, Me.
 Marine Mfg. & Supply Co.....New York.
 Moulton Steering Engine Co.....New York.
 Sheriffs Mfg. Co.....Milwaukee.

SUBMARINE DIVING APPARATUS.

Morse & Son, A. J.....Boston.
 Schrader's Son, A.....New York.

SURVEYORS, MARINE.

Gaskin, Edward Buffalo.
 Hynd, Alexander Cleveland.
 Lovejoy, H. O.....Buffalo.
 Matteson & Drake Philadelphia.
 Parker Bros. Co., Ltd.....Detroit.
 Nacey, James.....Cleveland.
 Rice, Henry Buffalo.
 Steel, Adam Cleveland.
 Wood, W. J.....Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co.....Chicago.
 Lunkenheimer Co.....Cincinnati, O.

TILING, INTERLOCKING RUBBER.

New York Belting & Packing Co.....New York.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Watson-Stillman Co.....New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc.....Philadelphia.

TOWING MACHINES.

American Ship Windlass Co.....Providence, R. I.
 Chase Machine Co.....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co.....Kingston, Ont.

TRAPS, STEAM.

Kieley & Mueller New York.
 Sturtevant Co., B. F., ...Hyde Park, Mass.

TRUCKS.

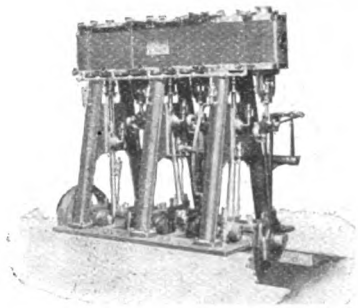
Boston & Lockport Block Co.....Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co.....Pittsburg, Pa.

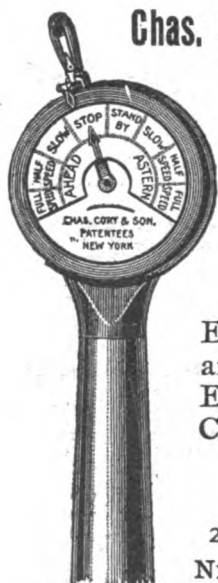
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Builders of Single, Compound, Triple-Expansion and Direct Connected Engines.

Boyer Sectional Water Tube boilers and machinery complete for light draft Passenger Boats, Yachts, Tugs, Etc.

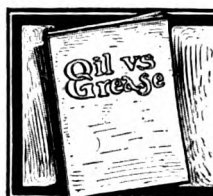


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Electrical
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Electric
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An Interesting Book on an Interesting and Important Subject.

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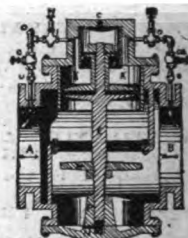
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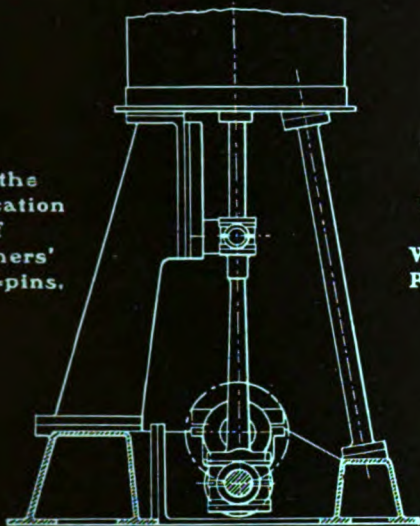
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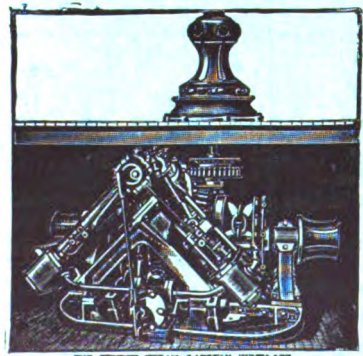
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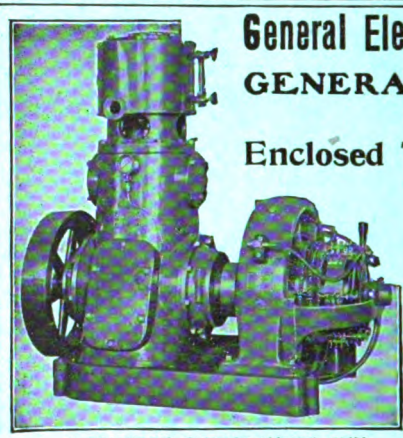
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